

AFFDL-TR-69-123
VOLUME IV

AID706919

**A STABILITY AND CONTROL PREDICTION
METHOD FOR HELICOPTERS AND
STOPPABLE ROTOR AIRCRAFT**

**VOLUME IV
APPENDICES**

BILLY J. BIRD

*Bell Helicopter Company
A Textron Company*

TECHNICAL REPORT AFFDL-TR-69-123, VOLUME IV

MARCH 1970

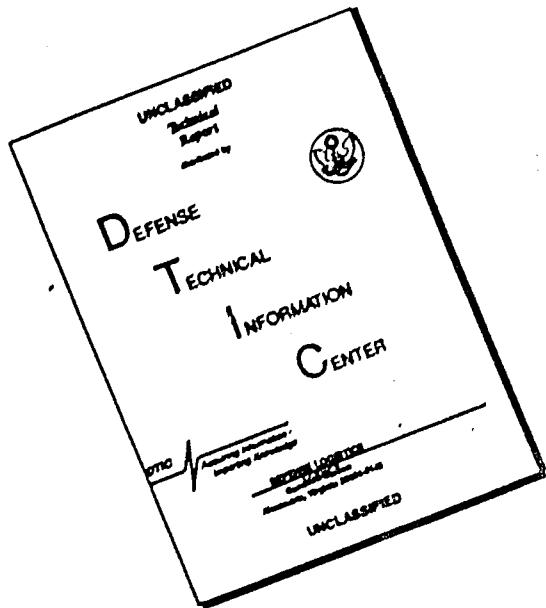
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FOREWORD

This report represents the results of the efforts expended in performance of Contract F33615-69-C-1121, "Development of Stability and Control Prediction Methods for Stoppable Rotor Aircraft." The work was performed by Bell Helicopter Company under Project No. 8219. It was sponsored by the Air Force Flight Dynamics Laboratory, Air Force Systems Command, from December 1968 through February 1970. Mr. Charles L. Livingston was the Bell Helicopter Company Project Engineer. Mr. Robert Nicholson was the Air Force Project Engineer.

This final report is presented in four volumes. The first describes the mathematical model and the methods used to calculate stability characteristics. They are of sufficient complexity that a digital computer is necessary for the solution of the equations. The second volume presents the results of sample computations and discusses input and output formats and good user techniques. The third volume describes the computer program while the fourth volume contains Appendices which are computer generated documentation of the program.

The author gratefully acknowledges the assistance of Messrs. B. L. Blankenship and Tyce McLarty of the Bell Helicopter Company Aeromechanics Group and Mr. C. L. Livingston of the Stability and Control Group in the development of the mathematical model.

This technical report has been reviewed and is approved.


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ABSTRACT

This report describes a mathematical model of rotorcraft that may be used to determine characteristics of performance, stability, response, and rotor blade loads. The complexity of the equations used requires the use of a digital computer for efficient solution. This four volume report describes the computer program in detail and illustrates the method of computing rotorcraft characteristics by specific example.

This volume contains the Appendices. Volume III describes the contents and use of these appendices in detail. The first and second volumes contain a discussion of the mathematical model and detailed instructions for the users of the program.

These appendices, which originate from card images for easy updating, are necessary tools for any programmer working on this program.

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APPENDIX A
VARIABLE DEFINITIONS

A (171) ARRAY NAME FOR FORCES AND MOMENTS
 B (21) BM AND BTR
 C (21) MAIN ROTOR BLADE WEIGHT DISTRIBUTION
 F (79) TRIM VALUES OF A AND OTHER FORCES
 I 1/2 RHO
 Q (2) RM AND RTR
 R MANEUVER TIME
 T VELOCITY - AIR SPEED
 V GROSS WEIGHT
 X (17) COMPUTED CORRECTIONS IN TRIM
 AH (3) UPPER SCALE LIMITS FOR PPLOT
 AL (3) LOWER SCALE LIMITS FOR PPLOT
 AP PITCH ANGLE OF ATTACK OF FUSELAGE
 AV SIDESLIP (NEW VALUE)
 BH (2) * S * B
 HM MAIN ROTOR NUMBER OF BLADES
 CD BEFORE RESOLUTION THROUGH INDUCED ANGLE OF ATTACK
 CL BEFORE RESOLUTION THROUGH INDUCED ANGLE OF ATTACK
 DT (21) TAIL ROTOR BLADE WEIGHT DISTRIBUTION
 ER (21) ERN AND ERTA
 HL (2) MAST LENGTHS
 IX FUSELAGE MOMENT OF INERTIA ABOUT X-AXIS (ROLL)
 IV FUSELAGE MOMENT OF INERTIA ABOUT Y-AXIS (PITCH)
 IZ FUSELAGE MOMENT OF INERTIA ABOUT Z-AXIS (YAW)
 DR (21) ORH AND ORTR
 PI 3.141593
 QL TOTAL ROLL MOMENT (X-COMPONENT - BODY REFERENCE)
 OM TOTAL PITCHING MOMENT (Y-COMPONENT - BODY REFERENCE)
 CN TOTAL YAW MOMENT (Z-COMPONENT - BODY REFERENCE)
 RM MAIN ROTOR RADIUS
 1. / W
 T1 (2) T1MT AND T1TT
 T2 (2) T2MT AND T2TT
 VH GROUND SPEED
 XB (2) 1. / NXR
 XF TOTAL X-FORCE (BODY REFERENCE)
 XK INTERMEDIATE VARIABLE
 XX GROUND REFERENCE X-COMPONENT OF DISTANCE FLOWN
 YF TOTAL Y-FORCE (BODY REFERENCE)
 YY GROUND REFERENCE Y-COMPONENT OF DISTANCE FLOWN
 ZF TOTAL Z-FORCE (BODY REFERENCE)
 ZZ GROUND REFERENCE Z-COMPONENT OF DISTANCE FLOWN
 AGW GEOMETRIC ANGLE OF ATTACK OF WING RELATIVE TO FUSELAGE CENTERLINE
 AIB (2) ROTOR BLADE INERTIAS
 ALT ALTITUDE
 ADR (2) (EXH / R) **2
 APD FUSELAGE PITCH RATE
 APE PITCH (FIXED - FUSELAGE)
 ARD FUSELAGE ROLL RATE
 ARE ROLL (FIXED - FUSELAGE)
 AYD FUSELAGE YAW RATE
 AYE YAW (FIXED - FUSELAGE)
 AIM SIDESLIP (PREVIOUS VALUE)
 AYI MAIN ROTOR (FORE/AFT FLAPPING)

T10 TAIL ROTOR - NUMBER OF BLADES
 B1 MAIN ROTOR (LATERAL FLAPPING)
 CLP SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 CLP SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 DCD DERIVATIVE OF CD WITH RESPECT TO ALPHA
 DCD SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 DCD SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 DQ1 SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 DQ1 SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 DQ2 DEGREES TO RADIANS CONVERSION FACTOR
 DQ2 (2) F/A SWASHPLATE INPUT FROM FLAT TRACKER
 DQ2 (2) LAT SWASHPLATE INPUT FROM FLAT TRACKER
 FPD PARTIAL DERIVATIVE INCREMENT FOR TRIM
 FRM MAIN ROTOR ALLOWABLE FLAPPING MOMENT ERROR FOR TRIM
 FOR (1C1) INPUT ALLOWABLE ERRORS ON TRIM FORCES AND MOMENTS
 ERX (2) ERXM AND ERXR
 EXH (2) HUB EXTENTS
 GNV FLAG ON ENGINE TORSIONAL SYSTEM -NORMALLY=0
 H4R MAIN ROTOR H-FORCE
 HTR TAIL ROTOR H-FORCE
 IND FLAG OR SWITCH TYPE VARIABLE
 IT4 ITERATION LIMIT TO BALANCE ROTOR FLAPPING MOMENTS IN ITROT
 TXZ FUSELAGE PRODUCTION OF INERTIA
 KMI NUMBER OF EQUATIONS IN SYSTEM
 LMR X-COMPONENT OF MOMENT DUE TO MAIN ROTOR FORCES
 LTR Y-COMPONENT OF MOMENT DUE TO TAIL ROTOR FORCES
 M12 Z-COMPONENT OF MOMENT DUE TO MAIN ROTOR FORCES
 M12 Y-COMPONENT OF MOMENT DUE TO TAIL ROTOR FORCES
 M12 Z-COMPONENT OF MOMENT DUE TO MAIN ROTOR FORCE
 NTR Z-COMPONENT OF MOMENT DUE TO TAIL ROTOR FORCE
 RPM MAIN ROTOR TIP SPEED
 PFD INTERMEDIATE VARIABLE IN PEDAL CALCULATION
 PSD MAIN ROTOR PSI DOT =OMEGA
 QMP TORQUE REQUIRED TO MAINTAIN CONSTANT RPM ON MAIN ROTOR
 JMX MAIN ROTOR TORQUE
 SPC PROP-ROTOR COLLECTIVE GOVERNOR FLAG - 0 OR 10
 Q09 COEFFICIENT FOR CALCULATING ENGINE TORQUE AVAILABLE
 QTR TAIL ROTOR TORQUE
 QW1 Q* 1/2 AREA OF WING
 PHO AIR DENSITY AT ALTITUDE
 PIY I. / IV
 RTP TAIL ROTOR RADIUS
 P12 1. / 12.
 SP1 (6,6,3) RATE DERIVATIVES IN STAB
 SWC (2) SWASH COEFFICIENTS
 T49 MAIN ROTOR THRUST
 TTR TAIL ROTOR THRUST
 T74 MAIN ROTOR ROLL COLLECTIVE PITCH FROM CONTROLS
 T7D (2) TZMT AND TZTT
 T7T TAIL ROTOR ROLL COLLECTIVE PITCH FROM CONTROLS
 T14 MAIN ROTOR F/A CYCLIC PITCH FROM CONTROLS
 T1T TAIL ROTOR F/A CYCLIC PITCH FROM CONTROLS
 T14 MAIN ROTOR LATERAL CYCLIC PITCH FROM CONTROLS
 T1T TAIL ROTOR LATERAL CYCLIC PITCH FROM CONTROLS
 V19 (2) VIMP AND VITR
 V19 DRAG/ADAPT VELOCITY ON WING FROM ON M.Q. INDUCED VELOCITY

V12 .5 • VROT 002
 V12 002
 V14
 VXB FUSELAGE X VELOCITY
 VXS X-COMPONENT OF VROT IN SWASHPLATE REFERENCE
 VYB Y-COMPONENT OF VROT IN SWASHPLATE REFERENCE
 VZB FUSELAGE Z VELOCITY
 VYS Y-COMPONENT OF VROT IN SWASHPLATE REFERENCE
 VZS Z-COMPONENT OF VROT IN SWASHPLATE REFERENCE
 ZAR (2) 1. MOMENT ARM OF ROTOR HUB
 ZAU (2) 2. BOMBIGHT GROUP INPUTS
 ZFL (14) ELEVATOR GROUP INPUTS
 ZFR (17) ALLOWABLE ERROR GROUP INPUTS
 ZFC (28) FLIGHT CONSTANTS GROUP INPUTS
 ZFN (17) FIN / RUDDER GROUP INPUTS
 ZFS (35) FUSELAGE GROUP INPUTS
 ZFW X-FORCE DUE TO WEIGHT
 ZGY (7) WEAPONS GROUP INPUTS
 ZIT (21) ITERATION LIMITS GROUP INPUTS
 ZMA (2) XMA1 AND XMA1
 ZM1 (2) XMB1 AND XMB1
 ZM2 (49) MAIN ROTOR GROUP INPUTS
 ZTA (49) TAIL ROTOR GROUP INPUTS
 ZW1 (21) WING CANUP INPUTS
 ZX1 X COMPONENT OF VELOCITY - FIXED AXES
 YAR (2) 1. MOMENT ARM OF ROTOR HUB
 YFL (21) INPUT CLCD CONSTANTS FOR ELEVATOR
 YFG (21) INPUT CLCD CONSTANTS FOR FIN
 YFS (14) COEFFICIENTS FOR CALCULATING FUSELAGE FORCES AND MOMENTS
 YFY Y-FORCE DUE TO WEIGHT
 YG1 (21) INPUT CLCD CONSTANTS FOR MAIN ROTOR
 YTA (21) INPUT CLCD CONSTANTS FOR TAIL ROTOR
 YWG (21) INPUT CLCD CONSTANTS FOR WING
 YY1 Y COMPONENT OF VELOCITY - FIXED AXES
 YVO VELOCITY OF SHIP CG DUE EAST IN FIXED REFERENCE
 ZAR (2) 2. MOMENT ARM OF ROTOR HUB
 ZFW Z-FORCE DUE TO WEIGHT
 ZI1 RATE OF DESCENT
 A1BP (2) A1BP AND A1BP1
 A1BP (2) A1BP AND A1BP1
 ALE TOTAL ANGLE OF ATTACK OF ELEVATOR
 ALGF FIN GEOMETRIC ANGLE
 AP1C APTO AND APTD
 APTA APTO
 APTP APTO
 ASEP YAW PILOT VARIABLE
 ASTD MAIN ROTOR INSTANTANEOUS PITCH
 ARAC CONSTANT - °
 ARTP (2) ARTO AND ARTD
 ARTD MAIN ROTOR INSTANTANEOUS ROLL
 ASEP YAW PILOT VARIABLE
 AVRC YAW FUSELAGE - GUM
 AVFD YAW FIXED - FLIGHT PATH
 A1TO A1 TAIL ROTOR
 RAIR (2) R • AIR
 BLCG BUTLINE LOCATION OF C.G.

BWT_C COEFFICIENT OF X DOT IN BOOMWEIGHT EQUATION
 BWT_K COEFFICIENT OF X IN BOOMWEIGHT EQUATION
 BWT_M CONSTANT MULTIPLIER OF $(G - G)$ PRELOAD IN BOOMWEIGHT EQUATION
 B1 TAIL ROTOR
 CDHB (12) CD FOR HUB SEGMENTS
 CGML CURRENT WATERLINE LOCATION OF CENTER OF GRAVITY
 CLBO SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 CNBD SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 COLL (16) INTERMEDIATE VARIABLES IN COLLECTIVE LINKAGES
 CYCF (13) INTERMEDIATE VARIABLES IN FA CYCLIC LINKAGES
 CYCL (13) INTERMEDIATE VARIABLES IN LAT CYCLIC LINKAGES
 LZET COSINE OF ZETA
 DAMP MAXIMUM ERROR FOR X LIMIT HALVING IN TRIM
 DEPD (10) INCREMENTS USED FOR CALCULATING PD IN TRIM
 DIST DISTANCE FROM
 DPIX IX / (IX * 1Z - 1XZ $\approx\! 2$)
 DPIZ IX / (IX * 1Z - 1XZ $\approx\! 2$)
 DPSI (2) CHANGE IN PSI BETWEEN AZIMUTH POSITIONS
 DTRR RADIAN TO DEGREES CONVERSION FACTOR
 EPDS PARTIAL DERIVATIVE INCREMENT FOR STAB
 EPDX (10) UNIT CONVERSION FACTOR IN APPLYING CORRECTIONS IN RATE
 FRTR TAIL ROTOR ALLOWABLE FLAPPING MOMENT ERROR FOR TRIM
 ERXM MAXIMUM ERROR FOR HALVING XLMAX
 ERXT MAXIMUM ERROR FOR HALVING LMAXT
 FTQ CORRECTION TO DYNAMIC PRESSURE AT ELEVATOR DUE TO WING WAKE
 FXIT ERROR INDICATOR - NOT ZERO INDICATES ERROR AND TERMINATES JOB
 FHPT (2) FLAPPING HINGE POINTS
 GFWD G-LEVEL IN FUSELAGE X-DIRECTION
 GLAT G-LEVEL IN FUSELAGE Y-DIRECTION
 ICOM (49) COMMENTS
 IPSN PROBLEM SERIAL NUMBER
 KCIT (20) VALUES OF J ON MANEUVER
 LELE X-COMPONENT OF MOMENT DUE TO ELEVATOR
 LFIN X-COMPONENT OF MOMENT DUE TO FIN
 LFUS X-COMPONENT OF MOMENT DUE TO FUSELAGE
 LGUN X-COMPONENT OF MOMENT DUE TO GUN
 LLINK SEGMENT INDICATOR TRIM=2 STAB=3 MANEUVER=4
 LL4G X-COMPONENT OF MOMENT DUE TO LEFT WING
 LQMR MAIN MOTOR TORQUE - X COMPONENT
 LOTP TAIL MOTOR TORQUE - X COMPONENT
 LROT COUNTERS FOR ROTORS. USED IN MAG
 LRNG X-COMPONENT OF MOMENT DUE TO RIGHT WING
 MASS TOTAL MASS
 MELF Y-COMPONENT OF MOMENT DUE TO ELEVATOR
 MFIN Y-COMPONENT OF MOMENT DUE TO FIN
 MFUS Y-COMPONENT OF MOMENT DUE TO FUSELAGE
 MGUN Y-COMPONENT OF MOMENT DUE TO GUN
 MLMG Y-COMPONENT OF MOMENT DUE TO LEFT WING
 MQMR Y-COMPONENT OF MOMENT DUE TO MAIN ROTOR TORQUE
 MOTR Y-COMPONENT OF MOMENT DUE TO TAIL ROTOR TORQUE
 MRNG Y-COMPONENT OF MOMENT DUE TO RIGHT WING
 NELE Z-COMPONENT OF MOMENT DUE TO ELEVATOR
 NFIN Z-COMPONENT OF MOMENT DUE TO FIN
 NFUS Z-COMPONENT OF MOMENT DUE TO FUSELAGE

Z-GUN	Z-COMPONENT OF MOMENT DUE TO GUN
NJET	NUMBER OF JETS
NLMG	Z-COMPONENT OF MOMENT DUE TO LEFT WING
VP51	(2) NUMBER OF AZIMUTH STATIONS
YOMR	Z-COMPONENT OF MOMENT DUE TO MAIN ROTOR TORQUE
YOTR	Z-COMPONENT OF MOMENT DUE TO TAIL ROTOR TORQUE
YRNG	Z-COMPONENT OF MOMENT DUE TO RIGHT WING
YWAG	INDICATOR- USE WAGNER-BUETTIKER FUNCTIONS O=DON'T
DRTR	TAIL ROTOR TIP SPEED
PEDA	(3) INTERMEDIATE VARIABLES IN PEDAL LINKAGE
PMOM	(2) PHOMM AND PMOUT
PSDD	PSI DOUBLE DOT
PSDT	PSI DOT
PSID	PSD AND PSDT
QELF	(2) PSD AREA OF ELEVATOR
QFIN	OF FIN
QMAX	MAXIMUM ENGINE TORQUE AVAILABLE
QMRS	ENGINE TORQUE SUPPLIED - TOTAL
OSV1	TORQUE AT TRIM POINT
RAIB	(2) 1. / AIR
RMMM	RMMM AND RMONT
ROTJ	SIGN CHANGER +1. = MAIN ROTOR, -1. = TAIL ROTOR
RTRP	(2) 1. / (TWOPI * R **2)
R550	1. / 550
SZET	SINE OF ZETA
TAXL	AUXILIARY THRUST LEFT
TAXR	AUXILIARY THRUST RIGHT OR CENTER
TIME	T - .05 * TDEL USED IN COMPARISONS INSTEAD OF T
TMAX	STOP TIME FOR TOEFL CURRENTLY IN USE
TZMS	MAIN ROTOR COLLECTIVE IF LOCKED
TZMT	MAIN ROTOR TOTAL ROOT COLLECTIVE
TZTT	TAIL ROTOR TOTAL ROOT COLLECTIVE
T1MS	MAIN ROTOR F/A CYCLIC IF LOCKED
T1MT	MAIN ROTOR TOTAL F/A CYCLIC
T1TS	TAIL ROTOR F/A CYCLIC IF LOCKED
T1TT	TAIL ROTOR TOTAL F/A CYCLIC
T2MS	MAIN ROTOR LAT CYCLIC IF LOCKED
T2MT	MAIN ROTOR TOTAL LAT CYCLIC
T2TS	TAIL ROTOR LAT CYCLIC IF LOCKED
T2TT	TAIL ROTOR TOTAL LAT CYCLIC
VIER	DOWNWARD VELOCITY ON ELEVATOR FROM ON M.R. INDUCED VELOCITY
VIMR	MAIN ROTOR INDUCED VELOCITY
VITR	TAIL ROTOR INDUCED VELOCITY
VROT	VELOCITY OF THE ROTOR HUB
VSND	RECIPROCAL OF THE SPEED OF SOUND
WLCG	WATERLINE LOCATION OF CENTER OF GRAVITY
XANG	X ARM OF THE WING
XCON	(63) CONTROLS GROUP INPUTS
XFMR	X-FORCE DUE TO MAIN MOTOR
XFTR	X-FORCE DUE TO TAIL ROTOR
XJET	(14) JET GROUP INPUTS
XX43	INTERMEDIATE VARIABLE
XLINK	(14) CONTROL LINKAGE RATIOS
XMA1	MAIN ROTOR LATERAL FLAPPING MOMENT

XMB1 MAIN ROTOR F/A FLAPPING MOMENT
 XMIN LOWER LIMIT ON VALUES OF X LIMIT
 YFIN (2) SAVED VALUES OF FIN LIFT -FOR DAMPING ON UNSTEADY AERODYNAMICS
 YFMR Y-FORCE DUE TO MAIN ROTOR
 YFTK Y-FORCE DUE TO TAIL ROTOR
 YMRF MAIN ROTOR Y-FORCE
 YTFR TAIL ROTOR Y-FORCE
 ZAWG Z ARM OF THE WING
 ZFTA MAIN ROTOR MAST TILT ANGLE
 ZFEL (2) SAVED VALUES OF FLEVATOR LIFT - FOR UNSTEADY AERODYNAMICS
 ZFMR Z-FORCE DUE TO MAIN ROTOR
 ZFTR Z-FORCE DUE TO TAIL ROTOR
 ZZTR TAIL ROTOR ALTITUDE
 AIRPM MAIN ROTOR LAT FLAPPING MOMENT DESIRED
 AIRPT TAIL ROTOR LAT FLAPPING MOMENT DESIRED
 AIRRM MAIN ROTOR F/A FLAPPING MOMENT DESIRED
 AIRBT TAIL ROTOR F/A FLAPPING MOMENT DESIRED
 ALCYP ANGLE FOR AILERON EFFECT
 ALERT OFF/ON INDICATOR ON YAW PILOT
 ALFIN TOTAL ANGLE OF ATTACK OF THE FIN
 ALGE2 COEFFICIENT USED IN COMPUTING ELEVATOR ANGLE OF ATTACK
 ALGE1 COEFFICIENT USED IN COMPUTING ELEVATOR ANGLE OF ATTACK
 ALGE2 COEFFICIENT USED IN COMPUTING ELEVATOR ANGLE OF ATTACK
 ALLWG TOTAL ANGLE OF ATTACK ON THE LEFT WING
 ALRWG TOTAL ANGLE OF ATTACK ON THE RIGHT WING
 APPTD TAIL ROTOR INSTANTANEOUS PITCH VELOCITY OF TIP PATH PLANE
 ARTTD TAIL ROTOR INSTANTANEOUS ROLL VELOCITY OF TIP PATH PLANE
 AYOMX MAXIMUM YAW RATE
 AYEFP SIDESLIP INDICATOR
 A1BAL A1 AFTER MOMENT BALANCE IN STAB
 AFTAT7 (2) PRECONES
 ANPSI = NUMBER OF BLADES / NUMBER OF AZIMUTH STA.
 A1BAL R1 AFTER MOMENT BALANCE IN STAB
 CDELF CD ON ELEVATOR
 COFIN C1 ON FIN
 CDLWG CD ON LEFT WING
 CDRWG CD ON RIGHT WING
 CGSTA CURRENT STATION LINE LOCATION OF CENTER OF GRAVITY
 CLACL SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 CLEL^c CL ON ELEVATOR
 CLFIN CL ON FIN
 CLLWG CL ON LEFT WING
 CLOCK COLLECTIVE LOCK INDICATOR 0=OFF / 1=ON
 CLRNG CL ON RIGHT WING
 CNRCL SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 CNPCD SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 CNPCL SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
 CNRCD SEE USFRS GUIDE TO INPUT FORMAT. WING GROUP
 CNRCL SEE USFRS GUIDE TO INPUT FORMAT. WING GROUP
 COLKS SAVED VALUE OF COLSTK
 COND1 CONDITIONAL OUTPUT INDICATOR
 COND2 COLLECTIVE PITCH WING INCIDENCE COUPLING FACTOR
 CPWIC WING CHORD -MEAN AERODYNAMIC CHORD = SORT(AREA/ARI)
 CWING

CYCR1 INTERMEDIATE VARIABLE BETWEEN F/A CYCLIC STICK AND ROTOR
 CYCR2 INTERMEDIATE VARIABLE BETWEEN LATERAL CYCLIC STICK AND ROTOR
 CZET4 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 CZET6 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 CZET9 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 DCAF'R (2) TIP VORTEX EFFECT COEFFICIENTS
 DELT2 DELTA TIME FOR RUNGE-KUTTA
 DIXX2 IX - IX
 DIXY2 IY - IY
 DIZY2 IZ - IZ
 DIZYX IX - IX
 DIZYY IY - IY
 DIZI2 / (IX * IZ - IXZ * **2)
 DTBWT CHANGE IN COLLECTIVE PITCH DUE TO BOBWIGHT
 DTZMT COLLECTIVE PITCH INPUT BY PROP ROTOR COLLECTIVE GOVERNOR
 DTZMI CHANGE IN COLLECTIVE PITCH DUE TO PITCH COME COUPLING MAIN ROTOR
 DTZT1 CHANGE IN COLLECTIVE PITCH DUE TO PITCH COME COUPLING TAIL ROTOR
 D3ELE COLLECTIVE STICK-ELEVATOR INCIDENCE COUPLING FACTOR
 FLOCK F/A CYCLIC LOCK INDICATOR
 FNSMC FIN SIDE-WASH COEFFICIENT
 FTKTS FT/SEC TO KNOTS CONVERSIC: FACTOR
 FVIND INDUCED VELOCITY CHANGE LIMITER
 GMAXV TOTAL GUST VELOCITY = GMAXVI + GMAXV2
 GUFS5 INPUT CONSTRL FOR FLIGHT CONSTANTS GUESSES
 GVERT G-LEVEL IN FUSELAGE Z-DIRECTION
 HDELT .5 * TOELT
 HGUST FUSELAGE X-COMPONENT OF GUST VELOCITY
 HLTR1 TAIL ROTOR WAKE LENGTH IF SIDE-BY-SIDE, = 0. OTHERWISE
 HLTR2 OPPOSITE OF HLTR1
 HUAKP MAIN ROTOR F/A HUB SPRING RATE PER BLADE
 HUBKR MAIN ROTOR LATERAL HUB SPRING RATE PER BLADE
 ITORS INERTIA OF TORSIONAL SYSTEM
 KREAD NUMBER OF MANEUVER CARDS FOR THIS RUN
 KTCTR POINTER TO WHICH TIME INCREMENT IS BEING USED IN MANEUVER
 LLJET X-COMPONENT OF MOMENT DUE TO LEFT OR CENTER JET THRUST
 LRJET X-COMPONENT OF MOMENT DUE TO RIGHT JET THRUST
 LWING COUNTER ON UNSTEADY AERODYNAMIC EFFECTS - WAGNER FUNCTION
 MLJET Y-COMPONENT OF MOMENT DUE TO LEFT OR CENTER JET THRUST
 MRJET Y-COMPONENT OF MOMENT DUE TO RIGHT JET THRUST
 NLJET Z-COMPONENT OF MOMENT DUE TO LEFT OR CENTER JET THRUST
 NOPS1 NUMBER OF AZIMUTH STATIONS
 NPART PRIMARY PATH CONTROL VARIABLE
 NPASS TRIM ITERATION COUNTER
 VRJET Z-COMPONENT OF MOMENT DUE TO RIGHT JET THRUST
 NVARA SECONDARY PATH CONTROL VARIABLE OR PLOT CODE NUMBER
 NVARR SECONDARY PATH CONTROL VARIABLE OR PLOT CODE NUMBER
 NVARC SFCOM PATH CONTROL VARIABLE OR PLDT CODE NUMBER
 DMEGN MAIN ROTOR SPEED IN RAD/SEC TARGET OR TRIM VALUE
 PCDEL CHANGE IN COLLECTIVE TO ADD TO M.R. AT THIS TIME INCREMENT PCG
 PEDAL PEDAL POSITION IN PERCENT
 PIU3? RADIANS/SEC TO RPM CONVERSION FACTOR, 30. / PI
 PMOMH MAIN ROTOR F/A HUBSPRING MOMENT, PER BLADE
 PMOMT TAIL ROTOR F/A HUBSPRING MOMENT, PER BLADE
 PMREL INPUT COEFFICIENT OF M.R. INDUCED VELOCITY ON ELEVATOR
 PMRWG INPUT COEFFICIENT OF M.R. INDUCED VELOCITY ON WING
 PTRFN INPUT COEFFICIENT OF T.R. INDUCED VELOCITY ON FIN

OMRS A
 MAXIMUM ENGINE TORQUE SUPPLIED -LIMITED BY THROTTLE
 COLLECTIVE PITCH RANGE
 RANGE =GMAXV1 / LNGTH1
 RATE1 RAMP GUST =GMAXV2 / LNGTH2
 RATE2 RAMP GUST =GMAXV2 / LNGTH2
 1. / MASS
 RMOMM MAIN ROTOR LAT HUBSPRING MOMENT. PER BLADE
 RMONT TAIL ROTOR LAT HUBSPRING MOMENT. PER BLADE
 RPIST INTERMEDIATE VARIABLE IN WING WAKE CALCULATIONS
 STACG STATION LOCATIN OF CENTER OF GRAVITY
 STOP2 END DISTANCE FOR 2ND RAMP OR HUMP =START2 +LNGTH2
 SWING WING SPAN
 SWKR1 (12) F/A SPRING RATES FOR FOCUSED PYLON EFFECT
 SWKR2 (12) LAT SPRING RATES FOR FOCUSED PYLON EFFECT
 SZET5 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 SZET7 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 SZET8 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 TDEL T TIME INCREMENT FOR MANEUVER SECTION
 THROT (12) PREVIOUS VALUE OF ROTOR THRUST
 TIP38 (12) TIP LOSS FACTORS
 TRALT TAIL ROTOR ALTITUDE
 TWOP1 6*283185
 TZERO START TIME FOR MANEUVER
 VGUST FUSELAGE Z-COMPONENT OF GUST VELOCITY
 VAKE VELOCITY AT WHICH ELEVATOR IS COMPLETELY SUBMERGED IN MR WAKE
 VCOL WING ANGLE OF ATTACK DUE TO COLLECTIVE COUPLING
 XAEL X ARM OF THE ELEVATOR
 XAFIN X ARM OF THE FIN
 XAFUS X ARM OF THE FUSELAGE
 XAGUN X ARM OF THE GUN
 XAJET X ARM OF THE JETS
 XAPYL X ARM OF THE PYLON
 XARSP (12) X ARM OF THE ROTOR SHAFT PIVOT POINT
 XFELE X-FORCE DUE TO ELEVATOR
 XFFIN X-FORCE DUE TO FIN
 XFFUS X-FORCE DUE TO FUSELAGE
 XFGUN X-FORCE DUE TO GUN
 XFLWG X-FORCE DUE TO LEFT WING
 XFRWG X-FORCE DUE TO RIGHT WING
 XGUST DISTANCE TO BEGINNING OF GUST AT TZERO
 XLOCK LATERAL CYCLIC-LOCK INDICATOR
 XMAIT TAIL ROTOR LATERAL FLAPPING MOMENT
 XMBIT TAIL ROTOR F/A FLAPPING MOMENT
 XSTAH (12) XSTAH AND YSTAH
 YAEL Y ARM OF THE ELEVATOR
 YAFIN Y ARM OF THE FIN
 YAFUS Y ARM OF THE FUSELAGE
 YAGUN Y ARM OF THE GUN
 YALWG Y ARM OF THE LEFT WING
 YARWG Y ARM OF THE RIGHT WING
 YFFIN Y-FORCE DUE TO FIN
 YFFUS Y-FORCE DUE TO FUSELAGE
 YFGUN Y-FORCE DUE TO GUN
 YGUST FUSELAGE Y-COMPONENT OF GUST VELOCITY
 YSTAH (12) YSTAH AND YSTAH

ZAELE ARM OF THE ELEVATOR
 ZAFIN ARM OF THE FIN
 ZAFUS ARM OF THE FUSELAGE
 ZAGUN ARM OF THE GUN
 7AJET ARM OF THE JETS
 ZAPYI ARM OF THE PYLON - INTERMEDIATE VARIABLE
 ZARSP (2) Z ARM OF THE MOTOR SHAFT PIVOT POINT
 ZFTAR (2) ZETA AND ZETATR
 ZFEL E 2-FORCE DUE TO ELEVATOR
 ZFFUS 2-FORCE DUE TO FUSELAGE
 ZFGUN 2-FORCE DUE TO GUN
 ZFLWG 2-FORCE DUE TO LEFT WING
 ZFRMG 2-FORCE DUE TO RIGHT WING
 ZMAX2 STOP TIME FOR SECOND TIME INCREMENT
 ZMAX3 STOP TIME FOR THIRD TIME INCREMENT
 ALCR1 WING ANGLE OF ATTACK FOR AILERON EFFECT
 ALGFD RUDER ANGLE OF ATTACK FROM PEDAL
 APBJET E-A. PITCH, FUSELAGE TO JET
 ARBJET CONSTANT = 0.
 ASECOL YAN PILOT VARIABLE
 AYBJET E-A. YAW, FUSELAGE TO JET
 BOTTOM LOWER LIMIT OF COLLECTIVE PITCH
 CNPCD1 INTERMEDIATE VARIABLE. FUNCTION OF CNPCD
 CNPCD2 INTERMEDIATE VARIABLE. FUNCTION OF CNPCD
 COLJET COLLECTIVE STICK - JET THRUST COUPLING FACTOR
 COLSTK COLLECTIVE STICK POSITION IN PERCENT
 CYPWIC LATERAL CYCLIC STICK WING INCIDENCE COUPLING FACTOR (AILERON EFF)
 CYSTK1 FORE/AFT CYCLIC STICK POSITION IN PERCENT
 CYSTK2 LATERAL CYCLIC STICK POSITION IN PERCENT
 CZET11 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 CZET12 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 CZET13 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 DCAFRK DCAFR * XK
 DELT2R 1. / DELT2
 DDCCOL O TORQUE / D COLLECTIVE FROM TRIM SECTION
 DTRRSQ RADIANNS **2 TO DEGREES **2 CONVERSION FACTOR. DTRR **2
 EIMAST COUPLING COEFFICIENT MAST TILT TO ELEVATOR INCIDENCE
 FIZETA ELEVATOR ANGLE OF ATTACK FROM MAST TILT
 ENGRPM ENGINE RPM
 ETAQMX REFERENCE VALUE OF ETAQ - AT CENTERLINE OF WING WAKE
 GEARAT GEAR RATIO TAIL ROTOR /MAIN ROTOR
 GMAXV1 FIRST MAXIMUM GUST VELOCITY
 GMAXV2 SECOND MAXIMUM CHANGE IN GUST VELOCITY
 GMAXV3 INTERMEDIATE VARIABLE = GMAXV1 -START2 *RATE2
 GPRELD G PRELOAD FOR BOBWEIGHT
 GUSTYP TYPE OF GUST "9.10.11.OR 12 AS J VALUE FOR GIVEN CASE
 HALFPI 1.570796. * S * PI
 HFORCE HMR AND HTR
 HGUSTE HORIZONTAL GUST VELOCITY AT ELEVATOR
 HGUSTF HORIZONTAL GUST VELOCITY AT FIN
 HGUSTW HORIZONTAL GUST VELOCITY AT WING
 HLPYLD DISTANCE FROM M.R. PIVO: POINT TO FLAT PLATE DRAG C.P. ON MAST
 HNPSIR 2. /NOPS1
 HUBKP AND HUBKTP

HUBKPS SPRING RATE PER BLADE -MAIN ROTOR PITCH (F/A)
 HUBKRP HUBKR AND HUBKTR
 HURKRS SPRING RATE PER BLADE -MAIN ROTOR ROLL
 HURKTP TAIL ROTOR F/A HUB SPRING RATE PER BLADE
 HURKTR TAIL ROTOR LATERAL HUB SPRING RATE PER BLADE
 HURTPS SPRING RATE PER BLADE -TAIL ROTOR PITCH
 HURTR SPRING RATE PER BLADE -TAIL ROTOR ROLL
 IPRINT BLADE ELEMENT DATA PRINT INDICATOR
 KONFIG CONFIGURATION NUMBER. = 1. + TRIND + TRIN01
 LAMBDA VELOCITY * SIN(ALFA) -INDUCED VELOCITY (NOT DIVIDED BY OMEGA *R)
 LENGTH1 LENGTH OF FIRST RAMP OR BASE OF HUMP FOR SIN**2 GUST
 MXPASS MAXIMUM NUMBER OF ITERATIONS ALLOWED IN TRIM (INPUT)
 NRADL NUMBER OF RADIAL STATIONS
 VSCLF SCALE FACTOR FOR PLOTS
 OMEGMD RATE OF CHANGE OF MAIN MOTOR SPEED (TARGET) RAD/SEC***2
 PCGDED PCG DEAD BAND
 PCGMAX MAXIMUM VALUE OF PCRATE
 PCRATE RATE OF CHANGE OF PCDEL
 PILGH1 INTERMEDIATE GUST VARIABLE = PI / LENGTH1
 PILGH2 INTERMEDIATE GUST VARIABLE = PI / LENGTH2
 PSD3OP MAIN ROTOR TO ENGINE GEAR RATIO
 PSD550 PSD / 550.
 PWGMK1 COEFFICIENT FOR DEFLECTION OF WING WAKE CENTERLINE
 PC10TR .0001745329. .01 * DTR
 ACWING 1. / CWING
 RDELT1 1. / TOELET
 RDELT2 1. / MOELT
 RITORS 1. / ITORS
 RUDDND RUDDER INDICATOR 1=WITH 0= WITHOUT
 START2 START DISTANCE FOR 2ND RAMP OR HUMP FROM END OF 1ST GUST
 SWINGH .5 * SWING
 SZFT10 INTERMEDIATE VARIABLE IN CONTROL LINKAGES
 TCLOCK TAIL ROTOR COLLECTIVE LOCK
 VENTER VELOCITY AT WHICH ELEVATOR ENTERS M.R. WAKE
 VGUSTF VERTICAL GUST VELOCITY ON ELEVATOR
 VGUSTW VERTICAL GUST VELOCITY ON WING
 VX4VFR INTERMEDIATE VARIABLE = 1. / (VMAXE-VENTER)
 WPTOR WEIGHT OF HUB ASSEMBLY AND BLADES
 XAPYLD X ARM OF THE PYLON DRAG
 XFLJET X FORCE DUE TO LEFT OR CENTER JET
 XFRJET X FORCE DUE TO RIGHT JET
 XLIMMIT MAXIMUM AMOUNT TRIM VARIABLES CAN CHANGE
 XLMAXM MAXIMUM VALUE OF XLIM FOR MAIN ROTOR
 XLMINM MINIMUM VALUE OF XLIM FOR MAIN ROTOR
 XLMINT MINIMUM VALUE OF XLIM FOR TAIL ROTOR
 XSTAHT TAIL ROTOR NORTH-SOUTH DISTANCE FROM START OF GUST TO HUB
 YARJET Y ARM OF RIGHT JET
 YFLJET Y FORCE DUE TO LEFT OR CENTER JET
 YFRJET Y FORCE DUE TO RIGHT JET
 YGUSTF LATERAL GUST VELOCITY ON THE FIN
 YGUSTW LATERAL GUST VELOCITY AT THE WING STATION LINF
 YSTAHW MAIN ROTOR EAST-WEST DISTANCE FROM START OF GUST TO HUB

YSTART TAIL ROTOR EAST-WEST DISTANCE FROM START OF GUST TO HUB
ZAPYLD Z ARM OF THE PYLON DRAG
ZDELT1 FIRST AND THIRD TIME INCREMENT FOR RUNGE-KUTTA INTEGRATION
ZDELT2 SECOND TIME INCREMENT FOR RUNGE-KUTTA INTEGRATION
ZETATR TAIL ROTOR MAST TILT ANGLE
ZFLJET Z FORCE DUE TO LEFT JET
ZFLWG1 SAVED VALUES OF LEFT WING LIFT- FOR UNSTEADY AERODYNAMICS
ZFRJET Z FORCE DUE TO RIGHT OR CENTER JET
ZFRWG1 SAVED VALUES OF RIGHT WING LIFT FOR UNSTEADY AERODYNAMICS

APPENDIX B
SUBROUTINES AND COMMONS CONTAINING EACH COMMON AND VARIABLE



15

18

C	S	R	C	T	I	V	D	A	S	W	T	P	S	D	I	P	C	
8	T	E	N	I	N	I	O	T	L	W	A	J	F	R	A	O	U	
1	A	A	N	E	N	R	N	T	R	A	C	A	G	S	L	M	R	
1	R	O	I	M	I	O	O	O	O	O	O	N	I	T	C	F	V	
T	I	I	T	I	I	I	I	I	I	I	I	T	I	I	I	I	I	
VARIABLE	N	I	N	I	N	I	I	I	I	I	I	O	O	O	O	O	O	
I	P	S	N	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
KCIT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LELE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LFIN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LFUS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LGUN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LINK	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LLMG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LQMR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LQTR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LROT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
LRWG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MASS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MELE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MFIN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MFUS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MGUN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MLMG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MQMR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MQTR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MRMG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NELE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NFIN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NFUS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NGUN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NJET	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NLWG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NPSI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NQMR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NOTR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NRWG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NWAG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
ORTR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
PEDA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
PFAC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
*PMON	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
PSDD	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
PSDT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
QELC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
QFIN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
QMAX	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
QMRS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
QSVI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
RAIR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
RFAC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
*RMON	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2470	TOPLOT	STRINA	2480															
	FORCE	FORCE	2490															
	FORCE	FORCE	2500															
	FORCE	FORCE	2520															
	FORCE	FORCE	2530															
	FORCE	FORCE	2540															
	FORCE	FORCE	2550															
	FORCE	FORCE	2560															
	FORCE	FORCE	2570															
	FORCE	FORCE	2580															
	FORCE	FORCE	2590															
	STRIAB	2600																
	FORCE	261C																
	FORCE	2620																
	FORCE	2630																
	FORCE	2640																
	FORCE	2650																
	FORCE	2660																
	FORCE	2670																
	FORCE	2680																
	FORCE	2690																
	FORCE	2700																
	FORCE	2710																
	FORCE	2720																
	STARAN	2730																
	ROMAN	2740																
	FORCE	2750																
	FORCE	2760																
	FORCE	2770																
	MANARD	2780																
	STRIMA	2790																
	AMDOIT	2820																
	STANRO	2830																
	MANAL	2840																
	ROMAN	2850																
	ROMAN	2860																
	STANRO	2870																
	STRIMA	2880																
	STRIMA	2890																
	STRIMA	2900																
	STARAN	2910																
	ROSTAR	2920																
	AMDOIT	2930																
	STANRO	2940																

C S R C T I V R I D A C S M M I V P G T W S L L S J A O U T P S D I P C			
S T E O N I N I O T D O N L M R A N A C U I R T M A E A J F R R A O A T V P S U			
I A A N E N R N T R A C A D O N I R G S L F A D M T C A F V I R L M R A L I R			
R D I M I O D A D O L D S T U T T			
T I T			
VARIABLE	N		
ROJ	x	x	
RTRP	x	x	
R550	x	x	
SZET	x	x	
TAR	x	x	
TAXL	x	x	
TAXR	x	x	
TIME	x	x	
TMAX	x	x	
TMRS	x	x	
TTRS	x	x	
TZMS	x	x	
TZMT	x	x	
TZTS	x	x	
TZTT	x	x	
TIMS	x	x	
TIMT	x	x	
TITS	x	x	
TITT	x	x	
T2MS	x	x	
T2MT	x	x	
T2TS	x	x	
T2TT	x	x	
VIER	x	x	
VIMR	x	x	
VITR	x	x	
VRDT	x	x	
VSND	x	x	
WLCG	x	x	
XAWG	x	x	
XCIT	x	x	
XCON	x	x	
XFMR	x	x	
XFTTR	x	x	
XJET	x	x	
XK43	x	x	
XLIN	x	x	
XLNK	x	x	
XMA1	x	x	
XMB1	x	x	
XMIN	x	x	
YFTN	x	x	
YFMR	x	x	
YFTTR	x	x	
YMRF	x	x	
YTRF	x	x	
ZAWG	x	x	
ZETA	x	x	

ANDOIT	2950
ROSTAR	2960
STAMAN	2970
MANAL	2980
ROSTAR	2990
MANAL	3000
MANAL	3010
STRIMA	3020
STRIMA	3030
STRIAB	3040
STRIAB	3050
STARAN	3060
ROMAN	3070
STARAN	3080
ROMAN	3090
STARAN	3100
ROMAN	3110
STARAN	3120
ROMAN	3130
STARAN	3140
ROMAN	3150
STARAN	3160
ROMAN	3170
STARAN	3180
MANARO	3190
MANARO	3200
STAMRO	3210
STAMRO	3220
STRIAB	3230
MANAL	3240
STRIMA	3250
STRIAB	3260
FORCE	3270
FORCE	3280
STRIAB	3290
ANDOIT	3300
STAMRO	3310
MANAL	3320
ROMAN	3330
ROMAN	3340
STRIAB	3350
STAMRO	3360
FORCE	3370
FORCE	3380
MANARO	3390
MANARO	3400
MANAL	3410
MANARO	3420

	C	S	R	C	M	I	V	P	G	T	W	S	L	J	O	N	T	P	D	I	P	C
VARIABLE	STE																					
TRALT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
TRIND	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
TTAB	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
TWIST	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
TWOP1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
TZERO	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
VGUST	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
VMAXE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
VZETA	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
WCOL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XAEL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XAFIN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XAFUS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XAGUN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XAJET	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XAPYL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XARSP	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XFELE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XFFIN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XFFUS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XFGUN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XFLWG	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XFRMG	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XGUST	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XLOCK	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XMAIT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XMBIT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
XMODM	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
*XSTAH	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YAELE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YAFRO	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YAFIN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YAFUS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YAGUN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YALMG	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YARSP	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YARMG	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YFFIN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YFFUS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YFGUN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
YGUST	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
*YSTAH	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ZAELE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ZAFIN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ZAFIS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ZAGUN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ZAJET	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

CSRCNT	IVRIDACSSW	MIVPGTWSLL	SJAOWTPSDIIPCC
STEONIN	NITONLWRANAC	RTMAEAJFRRAOATV	PBU
IA	ENRRA	CUIRGSSLFAOMTCAC	MRALR
RDI	MINODA	NIKGSLFAOHEOC	PIRDLV
TI	TT	OLDSTUTT	PHAVPIR
VARIABLE	N		E
ZAPYL	X		IBN
ZARSP	X	X	E
ZETAR	X		IBN
ZFEEL			E
ZFFUS			IBN
ZEGUN			E
ZFLMC			IBN
ZFRIG			E
ZMAX2	X	X	X
ZMAX3	X	X	X
ALECR1		X	X
ALGEPD		X	X
APBJET	X	X	X
ARBJET		X	X
ASECOL		X	X
AYBJET	X	X	X
*AZETAR		X	X
AZETAL		X	X
BETAES		X	X
BETAZD	X	X	X
25	BETALS	X	X
BOTTON		X	X
CLRADK		X	X
CNPCLD1		X	X
CNPCLD2		X	X
COLJET	X	X	X
COLSTK	X	X	X
CYPMIC		X	X
CYSTK1	X	X	X
CYSTK2	X	X	X
CZET11		X	X
CZET12		X	X
CZET13		X	X
DCAFKK		X	X
DELTA3		X	X
DELTA4		X	X
DDCOL		X	X
DTRRSQ	X	X	X
DXWGL		X	X
EIMAST	X	X	X
EIZETA		X	X
ENGRPM	X	X	X
ETAQMX	X	X	X
GEARAT	X	X	X
GMAX1		X	X
GMAX2		X	X
GMAX3		X	X
5350	STAMAN	STAMAN	STAMAN
5360	MANARO	MANARO	MANARO
5370	FORCE	FORCE	FORCE
5380	FORCE	FORCE	FORCE
5390	FORCE	FORCE	FORCE
5400	FORCE	FORCE	FORCE
5410	FORCE	FORCE	FORCE
5420	STRIMA	STRIMA	STRIMA
5430	STRIMA	STRIMA	STRIMA
5440	MANAL	MANAL	MANAL
5450	MANAL	MANAL	MANAL
5460	STARAN	STARAN	STARAN
5470	STARAN	STARAN	STARAN
5480	STARAN	STARAN	STARAN
5490	STARAN	STARAN	STARAN
5500	ROMAN	ROMAN	ROMAN
5510	ROMAN	ROMAN	ROMAN
5520	STRIAB	STRIAB	STRIAB
5530	ROMAN	ROMAN	ROMAN
5540	STAMAN	STAMAN	STAMAN
5550	MANAL	MANAL	MANAL
5560	ROSTAR	ROSTAR	ROSTAR
5570	STARAN	STARAN	STARAN
5580	STARAN	STARAN	STARAN
5590	STARAN	STARAN	STARAN
5600	MANARO	MANARO	MANARO
5610	STARAN	STARAN	STARAN
5620	STARAN	STARAN	STARAN
5630	MANARO	MANARO	MANARO
5640	MANAL	MANAL	MANAL
5650	MANAL	MANAL	MANAL
5660	MANAL	MANAL	MANAL
5670	ANDOLT	ANDOLT	ANDOLT
5680	STAMAN	STAMAN	STAMAN
5690	STAMAN	STAMAN	STAMAN
5700	STRIAB	STRIAB	STRIAB
5710	STARAN	STARAN	STARAN
5720	STARAN	STARAN	STARAN
5730	STARAN	STARAN	STARAN
5740	STARAN	STARAN	STARAN
5750	MANAL	MANAL	MANAL
5760	STRIAB	STRIAB	STRIAB
5770	STARAN	STARAN	STARAN
5780	STARAN	STARAN	STARAN
5790	STARAN	STARAN	STARAN
5800	ROMAN	ROMAN	ROMAN
5810	ROMAN	ROMAN	ROMAN
5820	ROMAN	ROMAN	ROMAN

C S R C N T I V R O D A C S W M I V P G T M S L L S J A O W T P S O I I P C C
G T E O N N I N T O R I O N L M R A N A C U I R T M A E A J F R R A O T V P B U
I A A N E N I O N T R A C O N I R G S L F A O M T C A F V I R L M R A L L I R
T O I N T O O L O S T U T T M B O O E C O T P M A V P I R O L Y
T N T

YABE

2

DOIT	6310
MAN	6320
BARAN	6330
MAL	6340
NAL	6350
ANARU	6360
NARO	6370
RIAB	6380
AMAN	6390
STAR	6400
STAR	6410
STAR	6420
ARAN	6430
NARO	6440
NARO	6450
ARAN	6460
MAN	6470
MAN	6480
STAR	6490
NAL	6500
RCE	6510
RCE	6520
STAR	6530
STAR	6540
RIAB	6550
STAR	6560
STAR	6570
STAR	6580
STAR	6590
MAN	6600
MAN	6610
ARAN	6620
ARAN	6630
RCE	6640
NARO	6650
RCE	6660
NARO	6670
NAL	6680
MAN	6690
MAN	6700
NAL	6710
IRIMA	6720
IRIMA	6730
NARO	6740
RCE	6750
NAL	6760
RCE	6770

COMMONS AND VARIABLES IN EACH SUBROUTINE AND COMMON
APPENDIX C

C81

TOPLOT
AH
AL
EXIT
IPSN
NPART
NTIME
NVARA
NVARB
NVARC
NVARS
NPRINT
NSCALE

START

STRIAB
STRIMA
STAMAN
MANAL
ROMAN
MANARO
STANRO
ROSTAR
STARAN
*6
D
O
T
W
BH
BM
DT
IX
IY
IZ
PI
ZZ
AGN
APE
ARE
AYE
ALH
BTR
61H
CLP
CLR
DTR
ERH
ERR
ITM
IZZ
PSD
OMS
RHO
R12
SMC
THR
TTR
XBN
XEL
XFC
XFN

XCON
XGN
XIT
XQR
XTR
XWG
XXI
YEL
YFN
YFS
YMR
YTR
YNG
YYD
ZZD
ALGF
APBG
AYBG
A1TR
BA16
BLCG
BWTC
SWTK
BWTM
B1TR
CGBL
CGML
CL8D
CNBO
DAMP
DTRR
XAFIN
ERTR
ERXM
ERXT
KVAR
NJET
PSDT
QF1N
QELE
QMAX
RAIB
TAIR
TAXL
TAXR
VSND
WLCG
ZAFIN
ZAGUN
ZAJET
ZAPYL
XANG

*ZETAR
APPJET
AVGJET
COLJET
COLSTK
CYSTK1
CYSTK2
DTRRSQ
EIMAST
ENGRPM
ETAQMX
GEARAT
PRELD
ALFPI
HLPYLD
MXPASS
PCGDED
PCGMAX
PSD30P
PWGEL1
PWGWK1
PO10TR
*THRUST
TRIND1
VENTER
XLIMIT
XLIMIT
XLIMIT
XLIMIT
YARJET
ZETATR

START

READIN

**STRIAB
STRIMA
TOPLOT
D
DT
XBW
XEL
XER
XFC
XFN
XFS
XGN
XIT
XMR
XTR
XWG
YFL
YFN
YMR
YTR
YMG
ICOM
IPSN
KCIT
TMAX
XCIT
XCON
XJET
GUFS
KRFAD
NPART
TSTA3
T2FRC
ZMAX2
ZMAX1
ZDFLT1
ZDELT2**

CNNI

STRIMA
MANAL
CMLL
CYCF
CYCL
PFDIA
T7MS
T2TS
TIMS
T1TS
T2MS
T2TS
ALGF1
ALGF2
CLOCK
CPMIC
FLACK
XLOCK
CYPMIC
HALFPI
RUDIND
TCLOCK

FORCE
 STRIAB
 STRIMA
 STAMAN
 MANAL
 ROMAN
 MANARD
 STANRO
 POSTAR
 TOPLJT
 STARAN
 Q
 V
 W
 Y
 A^M
 AP
 BN
 CT
 HL
 IX
 IV
 IZ
 RC
 RM
 PW
 XF
 ZZ
 AGW
 ALT
 APD
 APE
 ARD
 ARF
 AYD
 AYE
 A1M
 RTP
 A1P
 DOL
 DQN
 DTR
 ERR
 HMR
 HTR
 IND
 ITM
 ITM
 1x2

B1TR
 ORM
 PED
 PSD
 QMX
 OTR
 QWG
 RIV
 SWC
 TMR
 TTR
 TZM
 T2T
 T1M
 T1T
 T2M
 T2T
 UHS
 VIV
 VXB
 VXS
 VV8
 VVS
 VZB
 VZS
 XAR
 XFC
 XFW
 XMR
 XWG
 XXD
 YAR
 YFS
 YFW
 YWG
 YYD
 ZAR
 ZFW
 Z2D
 ALEL
 APDD
 APP
 ARD
 AYD
 AYDP
 ALR
 AYFP
 AITR
 BAIB
 BETA

ALFIN
 ALLWG
 ALRWG
 APBMT
 ARBMT
 AYBMT
 BETAE
 BETAN
 BETAX
 BETAZ
 BETAC
 BNPSI
 COELE
 CDFIN
 CDLWG
 CDRWG
 CGSTA
 CLELE
 CLFIN
 CLLWG
 CLRWG
 CNPCD
 APBJET
 ARBJET
 AYBJET
 CNPCD1
 CNPCD2
 COLJET
 COLSTK
 CYSTK1
 CYSTK2
 DXWGEI
 DZMGEL
 GEARAT
 GUSTYP
 HALFP1
 HGUSTE
 HGUSTF
 HGUSTW
 HNPSSIR
 IBRAKE
 KONFIG
 PILGH2
 PSD550
 PSTREF
 PSISTP
 RCWING
 RITORS
 RUDIND

RPIST
 SWING
 SWING
 TRAILT
 TRIND
 UPGUST
 URGUST
 URGUST
 VENTER
 VGUSTE
 VGUSTW
 VAWVER
 WROTOR
 XFLJET
 XFRJET
 XLIMIT
 XLMAXM
 XLMAXT
 XLMINN
 XLMINT
 VALJET
 VARSP
 XMAIT
 XMBIT
 YAERO
 YALWG
 YARSP
 YARWG
 ZAELE
 ZAJET
 ZARSP
 ZMAX2
 ZMAX3
 APBJET
 ARBJET
 AYBJET
 CNPCD1
 CNPCD2
 ZDELT2
 ZDELT1
 ZETATR
 ZFLJET
 ZFRJET

TINIT

STRIMA
STAMAN
HL
VH
DT1
DT2
KPD
QQQ
XXD
YYD
ZZD
APFP
ARBG
ASEP
AYFP
OMAX
R550
TAIR
ALERT
AYDMX
DTBWT
DTZMT
DTZM1
DTZT1
FTKTS
HGUST
HLTR2
1STOP
KTCTR
PCDEL
QMRSA
TRALT
TSTAB
VGUST
YGUST
ASECQ
TBRAKE
OMEGMD
PCRATE
RITORS
TRIND2

INRO

STPIAB
STAMAN
ROMAN
RSTAR
D
*R
AM
OT
ML
*UP
PM
XB
AIA
AIR
ADR
DTR
FXH
NKR
TIRW
PCC
PSO
PBM
QHM
RTT
D12
VXS
VYS
VTS
*ATRD
*ATBR
*APER
APTD
*AFDR
LDTD
HIC
CMB
VTPS
CHIT
LINT
NPST
DRT
*AIR
*TPD
WLCG
AIAPW

AIBPT
AIBRM
AIBRT
APTTD
ARTTD
AZETA
BETAN
BE TAX
BE TAZ
CONEK
DCAFR
HUBKP
HUBKR
STACG
SMKRI
SMKR2
TIP18
TIP38
TRIND
TWIST
TWOP1
VZFTA
XARSP
YARSP
ZARSP
*AZETAR
AZETAT
BFTAZD
BFTAZS
CLADK
DELTA3
*HUBKPR
HUBKPS
*HUBKRR
HUBKRS
HUBKTP
HURKTR
HURTPS
HURTPS
PSIRFF
*VZETAR
VZETAT

VIND

STANRD
R STAR
*2
*2
*2
*2
CT
*10
*4
ALT
AIP
HTD
CRM
RTS
HHS
*V1P
VLS
*VTR
V14P
VITA
VON
LAMPDA

AND'IT
PIOMAN
MANIARD
STANRD
RISTAR
TOPLOT
T
J
sp
T
Y
*T1
A1
R1
*T2
XK
Z
ALT
APU
AGR
APD
Aoe
AYN
AYF
AIM
RIM
HMP
HTR
FIN
JXR
FQR
HSH
H TC
SMC
T4P
TTO
VHS
VHS
V12
V14
VXR
VXS
VYR
VYS
VZR
VZS

XAR
YAR
AZETA
AIRD
BIRAL
CBFAC
COND2
DCAFR
GD1SX
APTD
ARDO
APDM
*APDR
APDS
APFM
APTO
ARDO
APTD
AYDO
AYFW
ALTR
R1TP
rxit
GRWD
GLAT
LINK
IRDY
NPSI
NWAG
RTR
PSNT
*PSIN
*PSIN
TAIP
TINT
Y1TT
T2TT
T2TT
V2OT
KK43
XLIM
YURF
YTRF
ZFTA
ZTR
APBMT
APDBS
APTTD
APBMT
ARDRS

MLMAXT
*YFORCE
VGUSTF
ZETATA
APTID
AYBMT
AZETA
AIRD
BIRAL
CBFAC
COND2
DCAFR
GD1SX
GVFR
NPSI
NVARC
NWARD
RM0MM
RM0MT
SMKR1
SMKR2
TANT1
TANT2
TDELT
THRDT
TRIND
VZETA
XMDMD
XMOML
*ZFTAR
*AZETAK
AZFTAT
DCAFXK
GUSTYP
*HFOPCF
HGUSTE
HGUSTF
HGUSTW
IPRINT
KTFIG
NTRADI
SHEARD
SHEARL
SHFARR
*THRUST
VGUSTE
VGUST
VGUST
*VZETAR
VZFTAT
MRATOR
*XLIMAX
XLMAXW

IVROT

ANDJIT
RUMAN
MANARD
STANRO
ROSTAR
TOPLOT
I
J.
A1
91
CT
*FR
*NP
PI
XY
ERM
*ERX
HMR
HTR
ITM
ORM
PCC
PSD
OMX
QTR
TMR
TTR
*TZ
*VIR
V12
V14
V25
*XM1
*XM8
*AI3P
*AIRR
DTRR
ERR
ERXN
ERXT
EXIT
LINK
ORT
PFAC
*PMJW
PSDT
*PSIO
RFAC

VRMOM
RTRP
T2MT
T2TT
VIMR
VITR
XLIM
XMA1
XMB1
YMRF
YTRF
AI8PM
AI8PT
AI8RM
AI8RT
AP0BS
AR0BS
AR0BS
BETA
BETAE
DETAN
BFTAX
DETAZ
DETAO
BMPSI
CON01
COND2
FVIND
P40MM
PROMT
RMM
RMONT
TANAI
TANBI
XMA1T
XMB1T
XMO0D
XMO0L
DCAFXK
\$HFORCE
LAMDA
SHEARD
SHEARL
SHEARR
\$THRUST
\$TORQUE
\$XLMIN
XLIMINT
\$YFORCE

ANDOID	*PFAC
R1MAN	*PMOM
MANARD	PSDT
STANRO	*PSID
R0STAP	RAIB
TOPLOT	RFAC
*P	RNTJ
Y	T2NT
AM	VIMR
RN	VITR
XB	VSND
XX	XK43
XY	AIR
	FXH
HMR	YMRF
HTP	YTRF
ORM	BETAD
PSD	BETAN
QMX	BETAX
QTR	BETAZ
PBH	BETAC
RT2	CBFAC
T4P	CONEK
TTB	DISK
*TZR	GMAXV
*V19	HUBKP
VX5	HUBKR
VYS	NCPSI
VZS	PMM
*XMA	PMOMT
*XMB	RATE1
APM	RATE2
APP	RDMM
APP4	RMOMT
ARD	STOP2
ARD5	TANA1
ARF	TANBI
AYFM	TANT1
REF1	TANT2
DIR	TIP18
EXIT	TWIST
LINK	XGUST
ORTR	XMAILT
	XMBIT
XMODD	XMODL
	*XSTAII
	*YSTAII
	BETA2D
	CLRADK
	DELTA3
	GMAXVI
	GMAXV2
	GMAXV3
	GUSTYP
	*MFORCE
	MPSIR
	*HUBKPR
	HUBKPS
	*HUBKRR
	HUBKRS
	HUBKTP
	HUBKTR
	HURTPS
	HURTRS
	IPRINT
	LAMDA
	LNGTH1
	MORADI
	PILGH1
	PILGH2
	PSIREF
	SHEARD
	SHEARL
	SHEARR
	START2
	*THRUSTI
	*TORQUE
	UPGUST
	URGUST
	UTGJUST
	XSTAHM
	XSTAII
	*YFORCE
	YSTAII
	YSTAII

OF IN	LOJFT	LWING	ARAJF	APRJR
SZFT	MRJFT	MRJFT	AYBJE	CNPCD
TAXL	MRJFT	MRJFT	CJPCD	COLST
TAXR	MRJFT	MRJFT	DNWGF	DWGF
VIFR	NLJET	NLJET	FIZET	FTAQMF
VIMA	NLJET	NLJET	PTAFN	HALFP
VITR	RHOMM	RHOMM	PQMM	PQMM
VORT	PQMM	PQMM	PQMM	PQMM
VSVND	PQMM	PQMM	PQMM	PQMM
ZABG	PQMM	PQMM	PQMM	PQMM
YVFR	YVFR	YVFR	YVFR	YVFR
ZFR	ZFR	ZFR	ZFR	ZFR
ZTFFP	ZTFFP	ZTFFP	ZTFFP	ZTFFP
ZANG	ZANG	ZANG	ZANG	ZANG
ZFTA	ZFTA	ZFTA	ZFTA	ZFTA
ZFFL	ZFFL	ZFFL	ZFFL	ZFFL
ZFMR	ZFMR	ZFMR	ZFMR	ZFMR
ZFTA	ZFTA	ZFTA	ZFTA	ZFTA
ZALCYP	ZALCYP	ZALCYP	ZALCYP	ZALCYP
HALFFIN	HALFFIN	HALFFIN	HALFFIN	HALFFIN
XALLING	XALLING	XALLING	XALLING	XALLING
VALREG	VALREG	VALREG	VALREG	VALREG
APPANT	APPANT	APPANT	APPANT	APPANT
ARMANT	ARMANT	ARMANT	ARMANT	ARMANT
AYAMNT	AYAMNT	AYAMNT	AYAMNT	AYAMNT
CODELE	CODELE	CODELE	CODELE	CODELE
CDFIN	CDFIN	CDFIN	CDFIN	CDFIN
CDLNG	CDLNG	CDLNG	CDLNG	CDLNG
CDRNG	CDRNG	CDRNG	CDRNG	CDRNG
CLACL	CLACL	CLACL	CLACL	CLACL
CLFLE	CLFLE	CLFLE	CLFLE	CLFLE
CLFIN	CLFIN	CLFIN	CLFIN	CLFIN
CLLAG	CLLAG	CLLAG	CLLAG	CLLAG
CLRAG	CLRAG	CLRAG	CLRAG	CLRAG
CMBCL	CMBCL	CMBCL	CMBCL	CMBCL
CMPCL	CMPCL	CMPCL	CMPCL	CMPCL
CMRCN	CMRCN	CMRCN	CMRCN	CMRCN
CMRCL	CMRCL	CMRCL	CMRCL	CMRCL
COLKS	COLKS	COLKS	COLKS	COLKS
CWING	CWING	CWING	CWING	CWING
DELE	DELE	DELE	DELE	DELE
DNMSMC	DNMSMC	DNMSMC	DNMSMC	DNMSMC
GFVRT	GFVRT	GFVRT	GFVRT	GFVRT
GRJFT	GRJFT	GRJFT	GRJFT	GRJFT
ALGFPO	ALGFPO	ALGFPO	ALGFPO	ALGFPO

C1CD

STAN
C1
C4
DCD
YAFRD

SMAS

MANAL
PED
TZM
TZY
TIM
TIT
T2W
T2T
CZET
TZMS
TZTS
TIMS
TITS
T2MS
T2TS
XLINK
CLOCK
CYCR1
CYCR2
CZET4
CZET6
CZET9
FLOCK
RANGE
SZETS
SZET7
SZET8
XLOCK
BOTTOM
CZET11
CZET12
CZET13
SZET10
TCLOCK

SMAS

एवं

यत्प्राण
प्राण
नाम
प्राण

मृत

ZMAX3	
ASECOL	AZETAT
T1LT	BOLSTZ
T1TT	COLSTK
T2MT	DELT2R
T2TT	GEARAT
ZETA	GPRELO
ZETR	HALFP1
ABDMT	HUBKPS
APYTD	HUBKRS
ARGMT	HUBKTP
ARTTD	HUBKTR
AYBMT	HUBTPS
BETAE	HUBTRS
BETAZ	I BRAKE
BETAO	PS550
BETAD	PSIREF
BETAE	PS1STP
BETAZ	QXRAK
BETAO	QBRAKE
BETAD	ROELT1
DIXIZ	ROELT2
DIVIX	RITORS
DIZIV	VZETAT
DPIXZ	ZDEL T1
DTBMZT	ZDEL T2
DTZM1	ZFLWGI
DTZT1	
GWERT	
MOELT	
HUBKP	
HUBKR	
ISTTP	
ITORS	
KTCTR	
NVARB	
NVARS	
OMEGM	
OMRSA	
RMASS	
TCELT	
THROT	
TRALT	
TRIND	
TSTAB	
THOP1	
VZETA	
ZFLWGC	
ZFRNG2	
ZMAX2	

INIT

FIRE

SPIRA
STAVAN
SIGNAL
ROMAN
MANIAC
TOPLOT

A

AP

AV

VH

ATM

914

1498

475

PSF

QWD

GAS

QTC

TMP

TTP

774

777

T1M

T1T

T24

T2T

VXS

VVS

V7S

ALFL

APPD

APTQ

ADYU

AVFD

ALTO

9112

CGRAL

CGML

7151

0051

0782

CFWQ

GLAY

IPSN

NPSI

OARS

GEARAT

HUKTP

HURKTR

KONFIG

YPRINT

PS0550

ORAKE

ZETATR

XMAIL

XMB1

YMRF

YTRF

ZFTA

ALFIN

ALLNG

ALRNG

APTTD

ARTD

RETAN

RF TAX

RETAD

CDELE

CDFIN

CDLNG

CDRNG

CGSTA

CLELF

CLFIN

CLLNG

CLRNG

CTRS

CVERT

MGUST

HUKP

HUBKP

NTIME

PEDAL

PTU30

VGUST

XMAIL

XMB1

VGUST

COLSK

CYSIKI

VARI

FORCE
STRIKE
STRIMA
STIMAN
MANAL
ROMAN
MANARD
TOPLOT
I
T
X
Y
AY
HL
7F
AGW
APO
APE
AVI
AI*
A1M
DTI
DT2
GOV
KMI
KPD
PED
PSO
QPC
QGU
TZM
T/T
T1M
T1T
T2M
T2T
XAR
YAP
ZAP
ALCF
APRG
ARPG
ASEP
AVAG
AITR
BETA
BETAT
CGML

MTRI
MTR2
HUBKI
HUBKA
HUBKP
HUBKR
LSTOP
KREAD
MGUN
NGUN
NP51
PEDA
PSDT
QMAX
QMR5
TAXL
TAXR
TIME
TZMS
TZTS
T1MS
T1TS
TZMS
TZTS
XCIT
XMA1
XMB1
ZETA
ALCP
ALERT
ALGE2
ALGE1
ALGE2
APRMT
AYMT
AYDMX
AZETA
BETAD
BETAN
BETAX
BETAZ
CGSTA
CLOCK
CPLIC
CPWIC
CYCR1
CYCR2
FLUCK
HDELT

RDELT2
RUDIMO
TCLOCK
TRIND2
VZETAT
ZETATR
TRIND
VZETA
NCCOL
XAGUN
XARSP
XFGUN
XLOCK
YAGUN
YARSP
YFGUN
ZAGUN
ZARSP
ZFGUN
ALECRI
ALGFPO
ALETAT
BETA2D
COLSTK
CYPWIC
CYSTK1
CYSTK2
DEL2R
HALFPI
HUBKPS
HUBKTP
HUBKTR
IBRAKE
KONFIG
NPRINT
OMEGMD
PCCMAX
PCRATE
PSDSO
PSIREF

PCG

OPC
HDFLT
OMEGM
PCDEL
OMEGMD
PCGDFD
PCGMAX
PCRATE

GUST

STAMAN
MANAL
ROMAN
MANARD
O
XX
YY
ADF
ARF
AYF
QWS
XAD
YAR
ZAR
XAW3
7ANG
CWIYG
GMAXV
HGUST
RATF1
RATE2
STOP2
VGUST
YAFL
YAFIN
XGUST
YAFIN
YAFIN
YAFIN
ZAFL
ZAFIN
CQA XVI
GQA XV2
GQA XV3
GUSTYD
HGUSTE
HGUSTF
HGUSTT
LNCTH1
PILTH1
STA2T?
VGISTE
VGISTW
YSTAH
YSTAH
YSTAH
YSTAH
YSTAH

FILE

STAMAN
MANAL
HL
RC
CGBL
CZET
SZET
XAWG
XINK
ZAWG
CZFT4
CZET6
CZFT9
RANGE
SZETS
SZET7
SZET 8
XAELE
XAFIN
XAFUS
XAGUN
XAJET
XAPYL
XARSP
YAELE
YAFIN
YAFUS
YAGUN
VALWG
VARSP
YARWG
ZAELE
ZAFIN
ZAFUS
ZAGUN
ZAJET
ZAPYL
ZARSP
BOTTOM
CZFT11
CZFT12
CZFT13
EIMAST
FIZETA
HLPYLD
POLDTR
SZFT10
KAPYLD

YALJET
YARJET
ZAPYLD

WRFM

FORCE
ROMAN
A
XMA1
XMB1
XMA1T
XMB1T

FORCE	T2M	AIBRM
STRIAB	T2T	AIBRT
STRIMA	VX6	APBMT
MANAL	VY6	APTID
ROMA ²	VZ6	ARBTID
MANARO	XFW	ARTTD
STANRO	XXD	AYRMT
TOPLOT	YFW	AIBAL
F	YYD	BETAE
J	ZFW	BNPSS
O	ZZD	BIBAL
V	APTO	CLOCK
W	ARTD	CWING
B ⁴	ALTR	DT2MT
PD	BLTR	DT2M1
QL	COLL	DT2T1
QM	CYCF	PEDAL
QN	CYCL	RANGE
XF	CZET	SWING
YF	DPSI	TRIND
ZF	DTRR	TS TAB
APD	EPDS	XAELE
APE	EXIT	XMAIT
ARD	LINK	XMBIT
ARE	NPSI	ASECOL
AYD	PEDA	BETAES
AYE	OSVI	COLSTK
AIM	SZET	CYSTK1
BTR	TAXL	CYSIK2
BIM	TAXR	DDCOL
DT1	TMRS	HNP SIR
OT2	TTRS	
HMR	TZMT	
HTR	TZTT	
ITM	TIHT	
KM1	T1 TT	
PCC	T2MT	
PSD	T2TT	
OMX	VIHR	
QTR	VI TR	
QMG	XANG	
SPD	XMA1	
TMR	XMB1	
TTT	YMRF	
TZM	YTRF	
TZT	ZETA	
TIM	AIBPM	
TIT	AI6PT	

L MODE

STRIAS
STANRO
IV
PD
OTR
SPD
YEL
YWG
MASS
QELF
VSND
DTRRSQ
PWGFL1

LAMODE

STRIAS
IX
IZ
PD
SPD
XFS
MASS

SETE

FORCE
STRIAB
MANARO
A

E

PD

HMR

HTR

KMI

ONX

QTR

TMR

TTR

QSVL

TMRS

TTRS

YMRF

YTRF

BETAE
BETAES

JACOB

STRIAB
MANARD
TOPLOT
F
PD
APE
ARE
AYE
AIM
BIM
EPD
KMI
QMX
QTR
TMR
TTR
AITR
BLTR
DFPD
EXIT
KVAR
QSVI
TMRS
TTRS
BETA
PEDAL
RETAES
COLSTK
CYSTK1
CYSTK2
DQDCOL

AJACOB

FORCF CYCF
STRIAB CYCL
STRIMA EXIT
MANAL LINK
ROMAN PEDA
MANARD TAXL
STANRO TAXR
TOPLOT TZMT
F TZTT
J T1MT
DL T1TT
DN T2MT
DX T2TT
DY XMA1
DZ XMB1
PO ALCYP
QL ALGE2
QM ALGE1
ON COND1
XF CPWIC
YF CYCRI
7F CYCR2
AGW DTZMT
APF DTZM1
ARF DTZT1
AYE PEDAL
AIM TRIND
BIM WCOL
DT1 XMALT
DT2 XMAIT
XMI ALECR1
PED ALGFPD
T2M ASECOL
T2T COLSTK
T1M CYPWIC
T1T CYSTK1
T2M CYSTK2
T2T RUDIND
VXR VYR
VZB VZB
XXD XXD
YYD YYD
ZZD ZZD
ALGF ALGF
AIT? AIT?
BITR BITR

OFFTRM

STRIAB
STRIMA
ROMAN
MANARO

V

Y

DL

DM

DN

DX

DY

DZ

APD

APF

ARD

ARE

AYD

AYE

IXZ

VXB

VYB

VZB

APPF

APTQ

ARTD

AYFP

MASS

ZETA

APBMT

APTTD

ARBMT

ARTTD

AYBMT

DIXIZ

DIVIX

DIZIV

URV

MANAO
HMR
HTR
OMX
QTR
TMR
TTR
KVAR
VIMR.
VITR
YMRF
YTRF
DETAO

TRIM

FORCE
STRIAB
STRIMA
MANAL
ROMAN
MANARO
STANRO
TOPLOT
V
X
Y
AY
R4
DL
Dw
DN
DX
DY
DZ
PD
APD
APF
ARD
ARE
AYD
AYF
A1M
RTR
B1M
IND
ITM
PSD
QMR
QMX
OTP
TMR
TTR
VXR
VYR
VZR
XIT
APTD
ARTD
AYFP
AITR
RITR
CYCF
CYCL

DIST
OPSI
EPDX
EXIT
LINK
NPSSI
PFDA
PSOT
QMRS
TAXL
TAXR
TIME
THRS
TTRS
YFIN
ZFEL
APTTD
ARTTD
AYEFF
BETAE
BNPSI
NPART
POPHI
PEDAL
RANGE
TOELT
TZERO
YFFIN
ZFELE
BETAES
COLSTK
CYSTK1
CYSTK2
GEARAT
MNPSIR
KONFIG
PILGH2
ZDELT1

PARA

FORCF
STRIAB
STRIMA
MANAL
ROMAN
MANARD
TOPLOT
PD
VH
AIR
APF
ARE
AYE
AIW
BIM
HMR
HTR
KWI
QMX
QTR
TMR
TTR
ZZD
ALFL
ALTR
BLTR
CGHL
DTRR
EXIT
OMAX
TAXL
TAXZ
TZMT
TZTT
TINT
TITT
T2MT
T2TT
YMF
YTRF
ZETA
ALFIN
ALLWG
ALRWG
CGSTA
FTKTS
NPASS
PFDAL

XFELE
XFFIN
XFLNG
XFRNG
YFFIN
ZFE-E
ZFLNG
ZFRNG
COLSTK
CYSTK1
CYSTK2
ENGRPM
GEARAT
KONFIG
PSD30P
PSD550
RUDIND
ZETATR

SOLVE

STRIAB
TOPLOT
X
KMI
EXIT
POPMI

DAMPER

DAMPER

STRIAS
EPD
DEPD
EPDX
XMIN
XLIM¹

ITRI

SPILAB	XLIMIT
MANAL	
MANARD	
STANRO	
TOPLOT	
F	
J	
Z	
X	
Y	
PQ	
PD	
A&F	
A&F	
AYF	
AIM	
BT2	
BIM	
ERB	
ITM	
KM1	
TMR	
TTR	
VXB	
VVR	
VZR	
XFC	
ALTR	
BITR	
DAMP	
EPDX	
EXIT	
TAXL	
TAXO	
TMRS	
TTRS	
AYEFP	
REFAE	
COND1	
NPASS	
PNPHI	
PEDAL	
BFTAES	
CYSTK1	
CYSTK2	
HALFP1	
MXPASS	

IVAR

STRIWA
ROMAN
PSD
QMR
COLL
CYCF
CYCL
DTRR
KCIT
PEDA
PSDT
XCIT
RETAN
GMAXV
HURKI
HUBKIN
HURKP
HUBKR
KRFAD
PIU3C
RATE1
RATE2
STOP2
XGUST
GMAXVI
GMAXV2
GMAXV3
HUBKTP
HUBKTR
LNGTH1
PILGH1
PSISTP
QXRRAK
START2

PLOT

TOPLOT
AH
AL
TPSN
NPART
NTIME
NVARA
NVARB
NVARC
NPRINT
NSCALE

C81L

TOPLOT
ICOM
IPSN
NSCALE

CURVET

TIPPLIT
AL
IVARA
IVARAS
IVARAC

FORCE

FIRCE	
A	LJET
QL	NLJET
ON	NRJET
QN	NLJET
XF	NRJET
YF	XFELE
ZF	XFFIN
LMP	XFFUS
LTR	XFGUN
MNR	XFLWG
MTR	XFRMG
NMP	YFFIN
NTR	YFFUS
NTR	YFGUN
XFW	XFELE
ZFW	ZFFUS
LFLC	ZFGUN
LFIN	ZFLWG
LFUS	ZFRMG
LGUN	XFLJET
LLWG	XFRJET
LQMR	YFLJET
LQT	YFRJET
LRWC	ZFLJET
MELF	ZFRJET
MFTV	
MFUS	
MGUN	
MLWG	
MQMR	
MOTR	
MRIC	
NFLC	
NFIN	
NFUS	
NGUN	
NLWG	
NQMR	
NOTR	
NRMC	
XFMQ	
XFT	
VFMP	
YFT	
ZFMD	
ZFT	
LLJET	

STRIAB

STAR
D
F
F
X
NL
DN
DN
DT
DX
DY
DZ
IX
IY
IZ
PD
JTR
EPD
ERA
KMI
RHO
z12
SPR
XBM
XEL
XEP
XFC
XFN
XFS
XGN
XIT
XMR
XTR
XWG
YEL
YFN
YMR
YTR
YNG
BLGG
DAMP
DEPD
EPDS
EPDX
MASS
OSV1
TMRS
TTRS

MLCG
XCON
XJET
XMIN
AYEFFP
CNPCCD
GUFS
NPASS
PDPHI
STACG
TZERO
BETAES
DODCOL
OTRASSO
ENGRPM
MKPASS
PSD3OP
TRIND1
x LIMIT

STRIMA

STRIMA
AY
VH
AGW
DT1
DT2
IXZ
QMR
XXD
YVD
ZZD
ALGF
APP
AYFP
CGWL
COLL
CYCF
CYCL
DIST
KCIT
PEDA
QMAX
QMRS
TIME
TMAX
XCIT
ALGEZ
ALGFI
ALGE2
CGSTA
CPWIC
DIXIZ
DIXIX
DIZIY
DTZMT
DTZM1
DTZT1
FTKTS
HUBKI
HURKM
KRFAD
PLU3C
TSTA3
ZMAX2
ZMAX3
ASECOL
CYPMIC
GEARAT

STRIMA

ANDRIIT

A1
A2
XX
VV
V12
V14
APDM
APDS
APFM
ARDM
ARDS
ARFM
AYFM
DFAC
PFAC
PTIJ
XK43
XLIM
APDBS
ARDBS
CBFAC
GDISK
NOPSI
YANA1
TANR1
TANT1
TANT2
X4000
X400ML
DCAFXX
IPRINT
NOPADL
SHFARD
SHEARL
SHFARR

STAMAN

HL	YGUST
RC	ZAGUN
XX	ZAPYL
YY	ZARSP
AY1	BETAZS
G0V	DELTZR
KPN	EIMAST
OPC	GPRELO
QQQ	HILPYLO
RIV	TBRAKE
APBG	OMEGMD
ARRG	PCGDED
ASFP	PCGMAX
AYBG	PCRATE
BWTC	P01DTR
BWTK	QBRAKE
RWTM	ROELT1
CGRL	RDELT2
COSF	RITORS
DPIX	TRIND2
DPIZ	
FMPY	
R550	
ALFR	
AYDMX	
DELT2	
OPIXZ	
OTRWT	
HDELT	
HGUST	
HLTR1	
HLTR2	
ISTP	
ITRS	
KTCTR	
OMEGD	
PCNFL	
OMRSA	
RMASS	
TRALT	
TWNP1	
VGUST	
XAGUN	
XAPYL	
XARSP	
YAGJN	
YARSP	

MANAL

MANAL
Q AP PED QMG TZM TZT T1M T1T T2M T2T ALEL CZET PSDD SZET TAXL TAXR XAWG XLNK ZAWG ALCYP ALFIN ALLWG ALRWG COELE CDFIN CDLWG CDRWG CLELE CLFIN CLLWG CLOCK CLRWG CMING CYCR1 CYCR2 CZET4 CZET6 CZET9 FLOCK RANGE SZETS SZET7 SZET8 WGCDL XAELE XAFIN XAFUS

MANAL

XAJET XLOCK YAFIN ZAELLE ZAFIN ZAFUS ZAJET ALECR1 ALGFPO BOTTOM CZET11 CZET12 CZET13 EIZETA HALFPI SZET10 TCLOCK XAPYLD YGUSTW ZAPYLD ZFLNG1

ROMAN
 *SR
 T
 *OR
 RM
 *T1
 *T2
 ZZ
 AIB
 AIR
 NRM
 PCC
 PSD
 RTR
 *TZR
 VMS
 VVS
 VZS
 *XMA
 *XM8
 *AIBP
 *AIBR
 APDO
 *APDR
 APTD
 ARDO
 *AROR
 ARTD
 AYDD
 BETA
 DPSI
 *TRR
 NPSI
 ORTR
 PSDT
 *PSID
 TZMT
 TZTT
 T1MT
 T1TT
 T2MT
 T2TT
 XMA1
 XMP1
 ZZTR
 AIRPM
 AIRDT
 AIRRM

XSTAH
 YSTAHM
 YSTAH

AIBRT
 ART'D
 ARTD
 AZETA
 BETAD
 BETAN
 BEТАX
 BETAZ
 BNPSI
 COND2
 GMAXV
 HUBKP
 HUBKR
 RATE1
 RATE2
 STOP2
 THROT
 TRIND
 VZETA
 XGUST
 XMAIT
 XMBIT
 *XSTAH
 *YSTAH
 *AZETAR
 AZETAT
 BETAZD
 GMAXVI
 GMAXV1
 GMAXV2
 GMAXV3
 GUSTYP
 HNPSSR
 *HUBKPR
 HUBKPS
 *HUBKRR
 HUBKRS
 HUBKTP
 HUBKTR
 HUATPS
 HUBTRS
 KONFIG
 LENGTH1
 PILOGH1
 PSIREF
 START2
 *VZETAR
 VZETAT
 XSTAHM

I	HGUSTE
V	HGUSTF
APO	HGUSTW
APE	*THRQUSF
ADJ	VGUSTE
APF	VGUSTW
AYD	*YFORCF
AYF	YGUSTF
AIM	ZETATO
ALM	HMR
HTZ	HTZ
TYD	QMX
OTR	OTR
TMR	TMR
TTR	TTR
*V1,	VXB
VXR	VYR
V7S	V7S
XAR	XAR
YAR	ZAP
ZAP	ALTZ
HTR	HTR
GFW)	GFW)
GLAT	GLAT
NWAG	NWAG
VIMR	VIMR
VITR	VITR
YMRF	YMRF
YTRF	YTRF
ZETA	ZETA
APSMT	APSMT
ARBMT	ARBMT
AYBAT	AYBAT
BETAE	BETAE
BETA9	BETA9
GVERT	GVERT
PEDAL	PEDAL
TOELT	TOELT
*ZFTAR	*ZFTAR
COLSTK	COLSTK
CYSTK1	CYSTK1
CYSTK2	CYSTK2
*MFJRCF	*MFJRCF

STANRO

STANRO

*B
J
W
RN
STR
ITM
VHS
LINK
*PMOM
QELE
*RMOM
VRDT
VSND
YFIN
ZFEL
AIRAL
BIBAL
COND1
PMOMM
PMOMT
RMOMM
RMOMT
SWING
PILGH2
PWGEL1

ROSTAR

A4
CT
*EP
DI
XB
ALT
ADR
ERM
*ERX
EXH
NXR
RBH
SWC
UHS
COMB
ERTR
ERXM
ERXT
LROT
RAIB
RTRP
TAIR
CONEK
OCAFR
FVIND
NVARD
SMKRI
SMKRQ2
TIP1B
TIP38
TWIST
CLRADK
DELTA3
LAMBDA
UPGUST
URGUST
UTGUST
WROTOR
*XLIMIN
XLMAXM
XLMAXT
XLMINM
XLMININT

TOPLOT

TOPLOT
AH
AL
EXIT
ICOM
IPSN
NPART
NTIME
NVARA
NVARB
NVARC
NVARS
NPRINT
NSCALE

STARAN

STARAN
RH
C7
C4
RM
CLP
CLR
JCN
DQL
DON
V1W
VFS
RAI
CLB
FNR
FTA
NJET
QFIN
T7MS
T7TS
TIMS
T1TC
T2MS
T2TS
VIFR
CLBCL
CNBCL
CNPCL
CNRCD
CNRCL
COLKS
D3ELF
FNSMC
LWING
PMREL
PMRWG
PTRFN
RPIST
VMAXE
YAFLE
YAERO
YAFUS
YALMG
VARWG
APBJET
ARBJET
AYBJET
CNPCD1

STARAN

CNPPCD2
COLJET
DXWGEI
OZNGEL
ETAQMX
PWGK1
RCWING
SWINGH
VENTFR
VXHVER
VALJET
VARJET

APPENDIX D
SUBROUTINES CONTAINING EACH VARIABLE, BY COMMON

	STATE	MINOR	MAJOR	CRITICAL	SEVERE	EXTREME
VARIABLE	ON	X	X	X	X	X
FORCF	ON	X	X	X	X	X
A	XF	X	X	X	X	X
QL	YF	X	X	X	X	X
Q4	ZFW	X	X	X	X	X
N	LTR	X	X	X	X	X
T	MMR	X	X	X	X	X
I	MTR	X	X	X	X	X
R	NMR	X	X	X	X	X
D	NTR	X	X	X	X	X
M	XFM	X	X	X	X	X
N	YFW	X	X	X	X	X
O	ZFW	X	X	X	X	X
P	LELE	X	X	X	X	X
Q	LFIN	X	X	X	X	X
S	LFUS	X	X	X	X	X
R	LGUN	X	X	X	X	X
I	LLWG	X	X	X	X	X
E	LOMR	X	X	X	X	X
C	LQTR	X	X	X	X	X
U	LRWG	X	X	X	X	X
M	MELE	X	X	X	X	X
F	MFIN	X	X	X	X	X
U	MFUS	X	X	X	X	X
S	MGUN	X	X	X	X	X
H	MLWG	X	X	X	X	X
M	HMGR	X	X	X	X	X
G	MQTR	X	X	X	X	X
W	MRWG	X	X	X	X	X
N	NELE	X	X	X	X	X
E	NFIN	X	X	X	X	X
C	NFUS	X	X	X	X	X
U	NGUN	X	X	X	X	X
H	NLWG	X	X	X	X	X
M	NQMR	X	X	X	X	X
G	NQTR	X	X	X	X	X
W	NRWG	X	X	X	X	X
N	XFMR	X	X	X	X	X
E	YFMR	X	X	X	X	X
C	YFTR	X	X	X	X	X
U	ZFMR	X	X	X	X	X
H	ZFTR	X	X	X	X	X
M	LLJET	X	X	X	X	X

VARIABLE	C	S	R	C	M	T	I	V	I	D	A	S	W	M	P	G	T	M	S	L	J	A	O	N	T	P	S	D	I	T	P	C		
FORCE																																		
LRJET	x																																	
MLJET	x																																	
MRJET	x																																	
NLJET	x																																	
NRJET	x																																	
XFELE																																		
XFFIN																																		
XFFUS																																		
XFGUN																																		
XFLMG																																		
XFRMG																																		
YFFIN																																		
YFFUS																																		
YFGUN																																		
ZFELE																																		
ZFFUS																																		
ZFGUN																																		
ZFLMG																																		
ZFRMG																																		
XFLJET																																		
XFRJET																																		
YFLJET																																		
YFRJET																																		
ZFLJFT																																		
ZFRJET																																		

	C	S	R	C	H	T	I	V	A	C	S	M	V	P	G	T	W	S	L	S	J	A	D	T	P	S	O	I	P	C		
	R	E	N	I	N	O	T	O	N	W	R	A	N	A	C	U	T	R	A	O	F	J	F	R	R	A	T	V	P	B	U	
	A	A	N	E	N	R	N	R	R	A	C	A	N	I	R	G	S	L	F	A	O	M	T	C	A	F	V	I	R	A	I	R
	R	O	I	M	I	O	D	A	O	D	S	T	U	I	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
VARIABLE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
STRIAB	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
D	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
F	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
DL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
DY	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
DZ	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
IX	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
IY	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
IZ	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
PD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
DTR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
ERR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
KM1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
RHM	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
P12	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
SPO	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XBN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XEL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XER	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XFC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XFN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XFS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XGN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XIT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XMP	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XTR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
XMG	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
YEL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
YFN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
YMR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
YTR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
YWG	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
BLCC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
DAMP	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
DEPO	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
EPDS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
FPOX	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
MASS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
OSWI	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
TMRS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
TRRS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		

	C	S	R	C	M	T	I	V	R	I	D	A	S	W	M	I	P	G	T	S	L	L	S	J	A	O	N	T	P	S	D	I	P	C			
STATEON	x																																				
IAANDIN	x																																				
ARDINT	x																																				
VARIABLE																																					
STRIAB	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
WLCCG	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
XCON	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
XJFT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
XMIN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
AYEFF	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
CNPDCD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
GUESS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
NPASS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
PDPHI	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
STACC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
TZERO	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
BETAFS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
DDCOL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
DTRRSO	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
ENGRPM	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
NPASS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
PSD3D	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
TRIND1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
XLIMIT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						

C S R C N T I V R I D A C S W M I V P G T W S L L S J A O N T P S O D I I P C C
 8 T E O N N I N I O T O N L W R A N A C U I R T M A E A J F R R A O A T V P S U
 I A A N E N R N T R R A C A O N I R G S U L F A O M T C A F V I R L M R A L I R
 I R D I H I O D A O O L D S T U I T M B D O E O C T P M A V P I R O L V
 T I T
 VARIABLE STRIMA
 AY
 VH
 AGW
 DT1
 DT2
 IXZ
 QMR
 XXD
 YYD
 ZZO
 ALGF
 APFP
 AYFP
 CGML
 COLL
 CYCF
 CYCL
 DIST
 KCIT
 PEDA
 OMAX
 QMRS
 TIME
 TMAX
 XCIT
 ALGEZ
 ALGE1
 ALGE2
 CGSTA
 CPMIC
 DIXIZ
 DIVIX
 DIZIY
 DTZMT
 DIZML
 DIZT1
 FTKTS
 HUBKM
 KREAD
 PIU20
 TSTAB
 ZMAX2
 ZMAX3
 ASECOL
 CYPMIC
 GEARAI

85

STRIMA

STIMA

1000 I

	C	S	R	C	M	T	I	V	R	I	D	A	C	S	W	M	V	P	G	T	W	S	L	J	A	O	N	T	P	S	O	I	P	C	C
8TEON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
IAAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ARDIM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VARIABLE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
STAMAN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
YGUST	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
ZAGUN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
ZAPYL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
ZARSP	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
BETAZS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
DELT2R	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
EIMAST	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
SPRELD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
HLHYLD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
IBRAKE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
QMEGMD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
PCGOED	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
PCGMAX	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
PCRATE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
PO1DTR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
QBRAKE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
RDELI1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
ROELT2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
RITORS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
TRIND2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		

MANAL

C	S	R	C	M	T	I	V	R	I	D	A	C	S	W	M	I	V	P	G	T	W	S	L	J	A	O	W	T	P	S	D	I	I	P	C	C								
G	T	E	N	I	N	I	N	I	O	T	O	N	L	W	R	A	N	A	C	U	I	R	H	A	E	A	J	F	R	R	A	O	A	T	V	P	U							
I	A	A	N	E	N	R	N	T	R	R	A	G	D	S	T	U	T	G	S	T	H	S	D	O	E	C	T	P	H	A	V	P	I	R	D	L	I	R						
T	I	I	D	I	M	I	N	I	O	D	A	D	O	D	N	T	T	G	T	H	S	D	O	E	C	T	P	H	A	V	P	I	R	D	L	I	R							
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N							
MANAL	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
MANAL	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
0	AP	PED	OWG	I2M	T2T	T1M	T1T	T2M	T2T	ALLEL	CZET	PSDD	SZET	TAXL	TAXR	XANG	XLINK	ZANG	ALCYP	ALFIN	ALLWG	ALLRG	COELE	COFIN	COLWG	CORWG	CLFLE	CLFIN	CLLWG	CLOCK	CLRWG	CWING	YCIR1	YCIR2	RANGE	SZETS	SZET7	SZET8	WGCOL	XAELE	XAFIN	XAFUS		

	C	S	R	C	M	I	V	I	D	A	S	M	P	G	T	W	S	L	L	S	J	A	O	N	T	P	D	I	P	C		
VARIABLE	MANAL	XAJET	XLOCK	YAFIN	ZAFLE	ZAFIN	ZAFUS	ZAJET	ALECR1	ALGFPD	BOTTON	CZET11	CZET12	CZET13	EIZETA	HALFPI	SZET10	TCLOCK	XAPYLD	YGUSTW	ZAPYLD	ZFLWG1										
MANAL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
XAJET	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
XLOCK	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
YAFIN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
ZAFLE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
ZAFIN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
ZAFUS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
ZAJET	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
ALECR1																																
ALGFPD																																
BOTTON																																
CZET11																																
CZET12																																
CZET13																																
EIZETA																																
HALFPI	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
SZET10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
TCLOCK	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
XAPYLD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
YGUSTW																																
ZAPYLD																																
ZFLWG1																																

ROMAN

CSSPC	IVRIT	DACSW	MIV	PCTW	SLL	JAO	WTSD	IPICC
8TFON	INN	TONLW	MAE	ACU	TMA	FRRAO	ATV	PSCU
1AAND	NE	TRACA	CA	IRG	IRG	VIR	ALM	ALIR
1RAD	DI	ODAOT	MT	GS	OL	PIR	OLV	YPIR
VARIABLE	TIN	ODANT	OCTP	AD	ED	PIR	EEM	ET
*R	X	X	DOE	TM	BDD	OR	ER	R
T	X	X	TT	BB	ED	OR	EM	X
*DR	RN	X	TM	BB	ED	OR	EM	X
*T1	*T2	X	X	X	X	X	X	X
22	A19	X	X	X	X	X	X	X
AIR	AIR	X	X	X	X	X	X	X
DRW	DRW	X	X	X	X	X	X	X
PCC	PSD	X	X	X	X	X	X	X
RTR	RTR	X	X	X	X	X	X	X
*TZR	VXS	X	X	X	X	X	X	X
VYS	VYS	X	X	X	X	X	X	X
VZS	VZS	X	X	X	X	X	X	X
**XMA	**XMA	X	X	X	X	X	X	X
**XMB	**XMB	X	X	X	X	X	X	X
*AIRP	*AIRR	X	X	X	X	X	X	X
*APND	APND	X	X	X	X	X	X	X
*APDR	APDR	X	X	X	X	X	X	X
APTN	APTN	X	X	X	X	X	X	X
ARDD	ARDD	X	X	X	X	X	X	X
*ARDR	ARDR	X	X	X	X	X	X	X
ARTD	ARTD	X	X	X	X	X	X	X
AYDD	AYDD	X	X	X	X	X	X	X
BETA	BETA	X	X	X	X	X	X	X
DPSI	DPSI	X	X	X	X	X	X	X
DTRR	DTRR	X	X	X	X	X	X	X
NPSI	NPSI	X	X	X	X	X	X	X
DRTR	DRTR	X	X	X	X	X	X	X
PSDT	PSDT	X	X	X	X	X	X	X
*PSIC	*PSIC	X	X	X	X	X	X	X
TZMT	TZMT	X	X	X	X	X	X	X
TZTT	TZTT	X	X	X	X	X	X	X
TIMT	TIMT	X	X	X	X	X	X	X
T1TT	T1TT	X	X	X	X	X	X	X
T24T	T24T	X	X	X	X	X	X	X
X4AI	X4AI	X	X	X	X	X	X	X
X4B1	X4B1	X	X	X	X	X	X	X
ZZTP	ZZTP	X	X	X	X	X	X	X
AIRPM	AIRPT	X	X	X	X	X	X	X
AIRPT	AIRPM	X	X	X	X	X	X	X

	C	S	R	C	M	T	I	V	R	I	D	A	S	M	I	P	G	T	W	S	L	L	S	J	A	O	N	T	P	S	D	I	P	C
VARIABLE	8	STE	ON	IN	INIT	ROT	ON	LN	AN	AC	UI	IR	RA	AT	V	P	8	U	1	AA	NE	NR	NT	RR	AC	AO	MT	CA	FV	IR	AL	1	R	
ROMAN	x																																	
AIBRT		x																																
APTTD			x																															
ARTTD			x																															
AZETA				x																														
BETAD			x	x																														
BETAN			x	x	x																													
BETAX			x	x	x	x																												
BETAZ			x	x	x	x	x																											
BNPSTI		x																																
COND2								x																										
GMAXV									x																									
HUBKP									x																									
HUBKR									x																									
RATE1										x																								
RATE2										x																								
STOP2											x																							
THROT											x																							
TRIND											x																							
VZETA											x																							
XGUST											x																							
XMAIT											x																							
XMBIT											x																							
*YSTAH												x																						
**AZETAR												x																						
AZETAT												x																						
BETAZD												x																						
GMAXVI												x																						
GMAXV2												x																						
GMAXV3												x																						
GUSTYP												x																						
HNPSTR												x																						
*HUBKPR												x																						
HUBKPS												x																						
*HUBKRR												x																						
HUBKRS												x																						
HUBKTP												x																						
HUBTPS												x																						
HUBTRS												x																						
KONFIG												x																						
LENGTH1												x																						
PILGH1												x																						
PSIREF												x																						
START2												x																						
*VZETAR												x																						
VZETAT												x																						

ROMAN

C	S	R	C	H	T	I	V	P	G	T	U	S	L	L	S	J	A	O	M	T	V	P	S	U
S	T	E	O	N	I	N	I	O	T	N	L	M	R	A	L	F	A	M	T	C	A	F	V	I
I	A	A	E	N	R	N	T	R	A	C	A	O	N	I	R	G	S	T	H	A	E	A	J	F
R	O	I	N	I	O	O	D	O	L	O	S	T	U	I	T	T	M	B	D	D	E	O	C	T
T	I	N	T	T	O	N	T	T	T	T	E	E	E	E	E	E	E	E	E	E	E	E	E	E
STAHM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ROMAN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
XSTAHT																								
YSTAHT																								
YSTAHT																								

	I	P	C	S	D	I	P	S	U	R	A	L	I	R	O	L	E	T
	J	A	O	W	T	P	R	S	L	S	L	M	V	G	H	M	X	X
	J	A	J	F	R	R	O	A	M	M	R	A	C	T	P	A	V	X
	J	A	J	F	R	R	O	A	M	M	R	A	C	T	P	A	V	X
	K	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	X
VARIABLE	V	APD	APE	ARD	ARE	AYD	AYE	AIY	BLM	HMR	HTR	IND	QMX	QTR	TMR	TTR	*VIR	
MANAPO	V	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	VXB	
T	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	VYB	
I	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	VZA	
N	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	XAR	
PDI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	YAP	
T	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	ZAP	
I	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	ALTR	
N	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	BLTR	
P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	GFWD	
D	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	GLAT	
I	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NWAG	
S	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	VIMR	
C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	VITR	
R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	YMRF	
E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	YTRF	
T	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	ZETA	
O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	APRMT	
L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	ARBMT	
A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	AYB4T	
M	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	BETAE	
R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	BETAO	
E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	GVERT	
T	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PEDAL	
O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TDELT	
L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	*ZETAR	
A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	COLSTK	
M	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	CYSTK1	
R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	CYSTK2	
E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	*HFORCE	

C	S	R	C	M	T	I	V	R	I	D	A	S	M	V	P	G	T	W	S	L	L	S	J	A	O	N	T	P	S	O	I	P	C				
8	T	F	O	4	I	N	I	O	T	O	N	1	W	R	A	N	C	U	I	R	T	M	A	E	A	J	F	R	A	O	A	T	V	P	S	U	
1	A	A	N	E	N	R	N	T	R	A	C	0	1	I	R	S	1	F	A	O	M	T	C	A	F	V	I	R	M	R	A	L	I	R	V		
R	O	I	M	I	O	D	O	O	L	O	D	0	0	T	U	T	I	T	H	B	D	D	E	O	C	T	P	M	A	V	P	I	R	O	L	V	
T	I	N	T	I	N	T	I	N	T	I	N	T	T	T	T	T	T	H	B	D	D	E	F	D	B	O	R	E	E	H	T	E	T	E			
VARIABLE																			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
MANARD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
HGUSTF	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
HGUSTM	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
*THRUST	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
*TNRQUE																																					
VGUSTE																																					
VGUSTW																																					
*YFORCE																																					
YGUSTF																																					
ZETATq	x																																				

STANRO

CSR	C	S	M	V	P	G	T	N	S	J	A	O	T	P	S	D	I	E	C
STE	O	N	I	N	I	O	R	I	N	A	C	O	N	I	R	G	S	L	F
IAA	A	N	E	N	R	A	T	R	A	C	A	O	D	O	D	O	O	O	A
IRD	I	D	I	M	I	D	O	D	O	O	D	S	T	T	B	D	D	D	I
TI	T	I	T	I	T	I	T	I	T	I	T	I	T	I	T	I	I	I	I
TIN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ROSTAR	X																		
AM																			
CT																			
*ER																			
PI																			
XB																			
ALT																			
ADR																			
ERM																			
*ERX																			
EXH																			
NXR																			
RBH																			
SMC																			
UHS																			
CDMB																			
ERTR																			
ERXM																			
ERXT																			
LROT																			
RAIB																			
RTRP																			
TAIR																			
CONEX																			
DCAFR																			
FVIND																			
NAVAR																			
SMKR1																			
SMKR2																			
TIP18																			
TIP38																			
TWIST																			
CLRADK																			
DELTAS																			
LAMBDA																			
JPGUST																			
URGUST																			
UTGUST																			
WROTOR																			
*XLIMAX																			
*XLIMIN																			
XLMAXT																			
XLMINM																			
XLMINT																			

	STATE	ON	IN	IR	DA	C	SUM	V	P	G	T	W	S	L	S	J	A	O	WT	PS	D	I	P	C
	TE	EN	NR	RR	AC	AC	AN	W	P	A	N	R	S	L	JA	ON	WT	PS	D	I	P	C		
	1	AA	NE	EN	R	R	A	C	A	C	N	R	S	S	L	JA	ON	WT	PS	D	I	P	C	
	QD	1	M	OD	DA	OO	D	OL	D	ST	U	I	TT	TT	TT	JA	ON	WT	PS	D	I	P	C	
	i	i	T	T	N	TT	N	T	T	T	T	T	T	T	T	JA	ON	WT	PS	D	I	P	C	
VARIABLE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
TOPLOT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
AH	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
AL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
FXTT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
ICN4	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
IPCN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
NPART	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
NTIMF	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
NVARA	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
NVARR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
NVARC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
NVARS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
NPqINT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
NSCAL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		

C	S	R	C	M	T	I	V	R	I	D	A	S	M	I	V	P	G	T	W	S	L	L	S	J	A	O	N	T	P	S	O	I	P	C	C	
B	T	E	O	N	I	N	R	I	O	T	N	W	R	A	N	A	C	I	T	M	S	L	L	S	J	A	O	N	T	P	S	O	I	P	C	C
I	A	A	N	E	N	R	R	A	C	A	O	N	I	R	G	S	S	L	F	A	O	M	T	C	A	F	V	I	R	L	M	R	A	L	I	R
I	R	O	I	M	I	O	O	A	O	D	S	T	T	T	M	B	D	O	E	O	C	T	P	H	A	V	P	I	R	O	L	V				
T	I	N	T	O	O	N	T	A	O	N	T	T	T	M	B	D	O	E	E	B	O	R	E	M	T	E	R	E	R	E	R	E	T			
VARIABLE																																				
STARAN	x	x																																		
SH																																				
C3																																				
C4																																				
SW																																				
CLP																																				
CL?																																				
NCN																																				
RQL																																				
DN																																				
VI																																				
YFS																																				
BAI																																				
CLR0																																				
CYAO																																				
FTA																																				
NJFT																																				
QETN																																				
TZ4S																																				
TZ5																																				
T145																																				
T1T5																																				
T245																																				
T2T5																																				
VIFR																																				
CLACL																																				
CNACI																																				
CNPCL																																				
CNOCN																																				
CNPCL																																				
C7LKS																																				
C3ELF																																				
FN5WC																																				
LWFWC																																				
P4RFL																																				
P4RAG																																				
PTOFM																																				
RP1ST																																				
VMAXF																																				
YAELF																																				
YAFRD																																				
YAFUR																																				
YALWC																																				
YAWGC																																				
AORJFT																																				
ABDJFT																																				
AVOJFT																																				
CUPCDI																																				

STARAN

S P C M I V A I D A C S U M I V P S T I N S L L S J A O N T P S D I I P C C	
T F C O N I N I T O N I W B A N A S U I R T M A E A J F R R A D A T V P S U	
A A N E N R A N T R A C A I - T F A O M T C A F V I R L M R A L I R	
P D I M I N D A O N L C S T U T I T T M B D O O F O C T P M A V P I R O L V	
V A B L E N T I T T E D B O R M E E M R E E I B M	
VARIABLE	x
C STARAN	x
C UPDN?	x
C CLJFT	x
D XWGFEL	x
P *WSEI	x
C TAQVK	x
P WGNK!	x
Q C*ING	x
S WIGH	x
V ENTR?	x
V XPUVE?	x
V ALJFI	x
V ADJET	x

x x

APPENDIX E
PROGRAM SECTIONS CONTAINING EACH VARIABLE. BY COMMAND

	C	S	R	A	M	S	T	P
STON	x	x	x	x	x	x	x	x
IATA	x	x	x	x	x	x	x	x
IRALUBM	x	x	x	x	x	x	x	x
TN	x	x	x	x	x	x	x	x
VAPITABLE	FORCE	x	x	x	x	x	x	x
	STRIAB	x	x	x	x	x	x	x
	STKIMA	x	x	x	x	x	x	x
	ANDUIT	x	x	x	x	x	x	x
	STAMAN	x	x	x	x	x	x	x
	MANAL	x	x	x	x	x	x	x
	ROMAN	x	x	x	x	x	x	x
	MANARD	x	x	x	x	x	x	x
	STANP	x	x	x	x	x	x	x
	POSTAR	x	x	x	x	x	x	x
	TOPLOT	x	x	x	x	x	x	x
	STARAN	x	x	x	x	x	x	x

C	S	R	A	M	S	T	P	
9	V	T	C	N	A	T	R	P
I	A	T	A	N	A	I	L	
R	A	L	U	B	M	O	T	
T	N							
VARIABLE	X	X	X	X	X	X	X	
FORCE	X	X	X	X	X	X	X	
A	X	X	X	X	X	X	X	
OL	X	X	X	X	X	X	X	
ON	X	X	X	X	X	X	X	
XF	X	X	X	X	X	X	X	
YF	X	X	X	X	X	X	X	
ZF	X	X	X	X	X	X	X	
LMR	X	X	X	X	X	X	X	
LTP	X	X	X	X	X	X	X	
NMP	X	X	X	X	X	X	X	
WTR	X	X	X	X	X	X	X	
NMR	X	X	X	X	X	X	X	
NTR	X	X	X	X	X	X	X	
XFW	X	X	X	X	X	X	X	
YFW	X	X	X	X	X	X	X	
ZFW	X	X	X	X	X	X	X	
LELF	X	X	X	X	X	X	X	
LETN	X	X	X	X	X	X	X	
LFUS	X	X	X	X	X	X	X	
LGUN	X	X	X	X	X	X	X	
LL4G	X	X	X	X	X	X	X	
LQQR	X	X	X	X	X	X	X	
LJTR	X	X	X	X	X	X	X	
LQWC	X	X	X	X	X	X	X	
MFLF	X	X	X	X	X	X	X	
WEIN	X	X	X	X	X	X	X	
WEHS	X	X	X	X	X	X	X	
MGHN	X	X	X	X	X	X	X	
MLWG	X	X	X	X	X	X	X	
HQMR	X	X	X	X	X	X	X	
WCTP	X	X	X	X	X	X	X	
WQWS	X	X	X	X	X	X	X	
NELF	X	X	X	X	X	X	X	
NFIN	X	X	X	X	X	X	X	
NFUS	X	X	X	X	X	X	X	
NCUIN	X	X	X	X	X	X	X	
VLWG	X	X	X	X	X	X	X	
NJWR	X	X	X	X	X	X	X	
NJTR	X	X	X	X	X	X	X	
NQNG	X	X	X	X	X	X	X	
XFMF	X	X	X	X	X	X	X	
XFTD	X	X	X	X	X	X	X	
VFMR	X	X	X	X	X	X	X	
VEFQ	X	X	X	X	X	X	X	
7FMP	X	X	X	X	X	X	X	
7FTD	X	X	X	X	X	X	X	
II-JET	X	X	X	X	X	X	X	

	C	S	R	A	M	S	T	P
	B	T	O	N	A	T	R	P
	I	A	T	A	N	A	I	L
	R	A	L	U	B	M	O	T
	T	N						
VARIABLE								
FORCE	x	x	x	x	x	x	x	x
LRJFT	x	x	x	x	x	x	x	x
MRJET	x	x	x	x	x	x	x	x
NRJET	x	x	x	x	x	x	x	x
XFFLE	x	x	x	x	x	x	x	x
XFFIN	x	x	x	x	x	x	x	x
XFFUS	x	x	x	x	x	x	x	x
XFGUN	x	x	x	x	x	x	x	x
XFLWG	x	x	x	x	x	x	x	x
XFRMG	x	x	x	x	x	x	x	x
YFFIN	x	x	x	x	x	x	x	x
YFFUS	x	x	x	x	x	x	x	x
YFGUN	x	x	x	x	x	x	x	x
ZFELE	x	x	x	x	x	x	x	x
ZFFUS	x	x	x	x	x	x	x	x
ZFGUN	x	x	x	x	x	x	x	x
ZFLWG	x	x	x	x	x	x	x	x
ZFRWG	x	x	x	x	x	x	x	x
XFLJFT	x	x	x	x	x	x	x	x
XFRJFT	x	x	x	x	x	x	x	x
YFLJFT	x	x	x	x	x	x	x	x
YFRJFT	x	x	x	x	x	x	x	x
ZFLJET	x	x	x	x	x	x	x	x
ZFRJET	x	x	x	x	x	x	x	x

STAGE

C	S	R	A	M	S	T	P
G	T	O	N	A	T	R	P
I	A	N	A	I	L	O	T
R	A	L	U	B	M	O	T
T	N						
VARIABLE							
STRIAS	x	x	x				
D	x		x	x	x	x	
E	x		x	x	x	x	
F	x		x	x	x	x	
DL			x	x	x	x	
DN	x		x	x	x	x	
DT			x	x	x	x	
DX			x	x	x	x	
DY			x	x	x	x	
DZ			x	x	x	x	
IX			x	x	x	x	
IY			x	x	x	x	
IZ			x	x	x	x	
PD			x	x	x	x	
DTR			x	x	x	x	
EPD			x	x	x	x	
ERR			x	x	x	x	
KM1			x	x	x	x	
RHO			x	x	x	x	
R12			x	x	x	x	
SPD			x	x	x	x	
XBM			x	x	x	x	
XEL			x	x	x	x	
XER			x	x	x	x	
XFC			x	x	x	x	
XFN			x	x	x	x	
XFS			x	x	x	x	
XGN			x	x	x	x	
XIT			x	x	x	x	
XMR			x	x	x	x	
XTR			x	x	x	x	
XMG			x	x	x	x	
YEL			x	x	x	x	
YFN			x	x	x	x	
YMR			x	x	x	x	
YTR			x	x	x	x	
YNG			x	x	x	x	
BLCG			x	x	x	x	
DAMP			x	x	x	x	
DEPD			x	x	x	x	
EPDS			x	x	x	x	
EPDX			x	x	x	x	
MASS			x	x	x	x	
QSV1			x	x	x	x	
TMRS			x	x	x	x	
TRRS			x	x	x	x	

STRIAB

	C	S	R	A	M	S	T	P
STRIA3	x	x	x	x	x	x	x	x
WLCG	x	x	x	x	x	x	x	x
XCON	x	x	x	x	x	x	x	x
XJET	x	x	x	x	x	x	x	x
XMIN	x	x	x	x	x	x	x	x
AYEFP	x	x	x	x	x	x	x	x
CNPDC	x	x	x	x	x	x	x	x
GUESS	x	x	x	x	x	x	x	x
NPASS	x	x	x	x	x	x	x	x
PPHI	x	x	x	x	x	x	x	x
STACG	x	x	x	x	x	x	x	x
TZERO	x	x	x	x	x	x	x	x
BETAES	x	x	x	x	x	x	x	x
DQDCOL	x	x	x	x	x	x	x	x
DTRRSQ	x	x	x	x	x	x	x	x
ENGRPY	x	x	x	x	x	x	x	x
MXPASS	x	x	x	x	x	x	x	x
PSD30P	x	x	x	x	x	x	x	x
TRINDI	x	x	x	x	x	x	x	x
XLIMIT	x	x	x	x	x	x	x	x

STIMA

STRIMA

VARIABLE	C	S	R	A	M	S	T	P
STRIMA	x	x	x	x	x	x	x	x
PS0557	x	x	x	x	x	x	x	x
PS1STP	x	x	x	x	x	x	x	x
QXRRAK	x	x	x	x	x	x	x	x
RJMIN10	x	x	x	x	x	x	x	x
ZDELT1	x	x	x	x	x	x	x	x
ZDELT2	x	x	x	x	x	x	x	x

ANDOIT

C	S	R	A	M	S	P
B	T	O	N	A	T	P
I	A	T	A	N	A	L
T	N	R	A	L	U	M
VARIABLE						
ANDOIT	x	x	x	x	x	x
A1	x	x	x	x	x	x
B1	x	x	x	x	x	x
XV	x	x	x	x	x	x
Y12	x	x	x	x	x	x
VT4	x	x	x	x	x	x
APDM	x	x	x	x	x	x
APDS	x	x	x	x	x	x
APPN	x	x	x	x	x	x
ARDM	x	x	x	x	x	x
ARDS	x	x	x	x	x	x
ARFM	x	x	x	x	x	x
AYFM	x	x	x	x	x	x
PFAC	x	x	x	x	x	x
RFAC	x	x	x	x	x	x
ROTJ	x	x	x	x	x	x
XK43	x	x	x	x	x	x
XLIM	x	x	x	x	x	x
APDBS	x	x	x	x	x	x
ARDBS	x	x	x	x	x	x
CBFAC	x	x	x	x	x	x
GDISK	x	x	x	x	x	x
NOPSJ	x	x	x	x	x	x
110	x	x	x	x	x	x
TANAI	x	x	x	x	x	x
TANBI	x	x	x	x	x	x
TANT1	x	x	x	x	x	x
TANT2	x	x	x	x	x	x
XMOND	x	x	x	x	x	x
XNOMNL	x	x	x	x	x	x
DCAFJK	x	x	x	x	x	x
IPRINT	x	x	x	x	x	x
NORAD	x	x	x	x	x	x
SHEARD	x	x	x	x	x	x
SHEARL	x	x	x	x	x	x
SHEARR	x	x	x	x	x	x

STAMAN

C S R A M S T P	9 T U N A T R P	I A T A N A T I L	I R A L U B M O	T
VARIABLE	STAMAN	HL	PC	XX
	X X X X X X X X	X X X X X X X X	X X X X X X X X	X X X X X X X X
AY1	YY	G7V	KPD	OPC
000	RIV	APBG	ARBG	ASEP
AYBG	BWTC	BWTK	BWTM	CGBL
BWSE	DPIX	DPIZ	FHPT	RS550
ALFR	AYDMX	DELT2	DPIXZ	DTWT
AYDMX	DELT	DELT2	DTWT	HDELT
HGUST	MLTR1	MLTR2	MLTR2	MLTR2
KTCTR	MLTR1	MLTR2	MLTR2	MLTR2
U4EGM	MLTR1	MLTR2	MLTR2	MLTR2
PCDEL	MLTR1	MLTR2	MLTR2	MLTR2
OMRSA	MLTR1	MLTR2	MLTR2	MLTR2
R4ASS	MLTR1	MLTR2	MLTR2	MLTR2
TRALT	MLTR1	MLTR2	MLTR2	MLTR2
VGUST	MLTR1	MLTR2	MLTR2	MLTR2
XAGUN	MLTR1	MLTR2	MLTR2	MLTR2
XAPYL	MLTR1	MLTR2	MLTR2	MLTR2
XARSP	MLTR1	MLTR2	MLTR2	MLTR2
YAGUN	MLTR1	MLTR2	MLTR2	MLTR2
YARSP	MLTR1	MLTR2	MLTR2	MLTR2

STAHAN

MANUAL

CSP	STP
STATNATP	
STATNATL	
STALUBNO	
TN	T
VARIABLE	
MANAL	X X X X
O	X X X X
AD	X X X X
PED	X X X X
OWG	X X X X
T24	X X X X
T2T	X X X X
ALEL	X X X X
CZFT	X X X X
PSDN	X X X X
SZET	X X X X
TAXL	X X X X
TAXR	X X X X
XAMG	X X X X
XLNK	X X X X
ZAWG	X X X X
ALCYP	X X X X
ALFIN	X X X X
ALLWG	X X X X
ALRMG	X X X X
COELF	X X X X
CDFIN	X X X X
COLWG	X X X X
CDRMG	X X X X
CLFLC	X X X X
CLFIN	X X X X
CLLWG	X X X X
CLOCK	X X X X
CLRWG	X X X X
CWING	X X X X
CYCR1	X X X X
CYCQ2	X X X X
CZET4	X X X X
CZETO	X X X X
CZET9	X X X X
FLOCK	X X X X
RANGE	X X X X
SZFT5	X X X X
SZFT7	X X X X
WGCOL	X X X X
XAELE	X X X X
XAFIN	X X X X
XAFUS	X X X X

MAMAL

	C	S	R	A	N	S	T	P
	6	7	0	1	1	1	1	1
VARIABLE	I	A	T	A	N	A	I	L
MAMAL	x	x	x	x	x	x	x	x
XAJET	x	x	x	x	x	x	x	x
XLOCK	x	x	x	x	x	x	x	x
YAF13	x	x	x	x	x	x	x	x
ZAELE	x	x	x	x	x	x	x	x
ZAFIN	x	x	x	x	x	x	x	x
ZAFUS	x	x	x	x	x	x	x	x
ZAJET	x	x	x	x	x	x	x	x
ALECR1								
ALGFPD								
BOTTOM			x					
CZET11			x	x	x	x	x	x
CZET12			x	x	x	x	x	x
CZET13			x	x	x	x	x	x
EIZETA			x					
HALFPI			x					
SZET10			x	x	x	x	x	x
TCLOCK			x	x	x	x	x	x
XAPYLD			x					
YGUSTW			x					
ZAPYLD			x					
ZFLWG1			x					

C	S	R	A	M	S	T	P
8	T	O	N	A	T	R	P
I	A	T	A	N	A	L	
R	A	L	U	B	M	O	
T	N						T
VARIABLE							
ROMAN	x	x	x	x	x	x	
*R	x	x	x	x	x	x	
T	x	x	x	x	x	x	
*OR	x	x	x	x	x	x	
RM	x	x	x	x	x	x	
*T1	x	x	x	x	x	x	
*T2	x	x	x	x	x	x	
ZZ	x	x	x	x	x	x	
AIB	x	x	x	x	x	x	
AIR	x	x	x	x	x	x	
DRM	x	x	x	x	x	x	
PCC	x	x	x	x	x	x	
PSD	x	x	x	x	x	x	
RT	x	x	x	x	x	x	
*TZR	x	x	x	x	x	x	
VXS	x	x	x	x	x	x	
VYS	x	x	x	x	x	x	
VZS	x	x	x	x	x	x	
*XMA	x	x	x	x	x	x	
*XMB	x	x	x	x	x	x	
*AIBP	x	x	x	x	x	x	
*AIBR	x	x	x	x	x	x	
APDD	x	x	x	x	x	x	
*APDR	x	x	x	x	x	x	
APTD	x	x	x	x	x	x	
ARDD	x	x	x	x	x	x	
*ARDR	x	x	x	x	x	x	
ARTD	x	x	x	x	x	x	
AYDD	x	x	x	x	x	x	
BETA	x	x	x	x	x	x	
DPSI	x	x	x	x	x	x	
DTRR	x	x	x	x	x	x	
NPSI	x	x	x	x	x	x	
ORTK	x	x	x	x	x	x	
PSDT	x	x	x	x	x	x	
*PSID	x	x	x	x	x	x	
T2MT	x	x	x	x	x	x	
T2TT	x	x	x	x	x	x	
T1MT	x	x	x	x	x	x	
T1TT	x	x	x	x	x	x	
T2MT	x	x	x	x	x	x	
T2TT	x	x	x	x	x	x	
XMA1	x	x	x	x	x	x	
XMB1	x	x	x	x	x	x	
ZZTR	x	x	x	x	x	x	
AIBPM	x	x	x	x	x	x	
AIBPT	x	x	x	x	x	x	
AIBRM	x	x	x	x	x	x	

ROMAN

	C	S	R	A	M	S	T	P
	8	7	6	5	4	3	2	1
VARIABLE	R	O	M	A	N	A	T	R
RROMAN	x	x	x	x	x	x	x	x
AIRRT	x	x	x	x	x	x	x	x
APTTD	x	x	x	x	x	x	x	x
ARTTD	x	x	x	x	x	x	x	x
AZETIA	x	x	x	x	x	x	x	x
BETAD	x	x	x	x	x	x	x	x
RETAN	x	x	x	x	x	x	x	x
RETAX	x	x	x	x	x	x	x	x
BETAZ	x	x	x	x	x	x	x	x
ANPSI	x	x	x	x	x	x	x	x
CND2	x	x	x	x	x	x	x	x
GMAXV	x	x	x	x	x	x	x	x
HUBKP	x	x	x	x	x	x	x	x
HUBKR	x	x	x	x	x	x	x	x
RATE1	x	x	x	x	x	x	x	x
RATE2	x	x	x	x	x	x	x	x
STn2	x	x	x	x	x	x	x	x
THROT	x	x	x	x	x	x	x	x
TRIND	x	x	x	x	x	x	x	x
VZETA	x	x	x	x	x	x	x	x
XGUST	x	x	x	x	x	x	x	x
XMA1T	x	x	x	x	x	x	x	x
XMAIT	x	x	x	x	x	x	x	x
*XSTA ¹	x	x	x	x	x	x	x	x
*YSTAH	x	x	x	x	x	x	x	x
*AZETAR	x	x	x	x	x	x	x	x
AZETAT	x	x	x	x	x	x	x	x
RETAZD	x	x	x	x	x	x	x	x
GMAXV1	x	x	x	x	x	x	x	x
GMAXV2	x	x	x	x	x	x	x	x
GMAXV3	x	x	x	x	x	x	x	x
GUSTY ²	x	x	x	x	x	x	x	x
HNPSTR	x	x	x	x	x	x	x	x
*HUBKPR	x	x	x	x	x	x	x	x
HUKPS	x	x	x	x	x	x	x	x
*HUBKRO	x	x	x	x	x	x	x	x
HUKPS	x	x	x	x	x	x	x	x
HUKTR	x	x	x	x	x	x	x	x
HURTPS	x	x	x	x	x	x	x	x
HU3TRS	x	x	x	x	x	x	x	x
KONFIG	x	x	x	x	x	x	x	x
LNGTH1	x	x	x	x	x	x	x	x
PLIGH1	x	x	x	x	x	x	x	x
PSIREF	x	x	x	x	x	x	x	x
START?	x	x	x	x	x	x	x	x
*VZFTAR	x	x	x	x	x	x	x	x
VZFTAT	x	x	x	x	x	x	x	x

C	S	R	A	M	S	T	P
R	O	M	A	N	A	T	R
I	A	I	A	N	A	I	L
P	A	L	U	B	M	O	
T	N						T

VARIABLE
 ROMAN X X X X
 XSTAHM X X X X
 XSTAHT X X X X
 YSTAHM X X X X
 YSTAHT X X X X

ROMAN

MANARO

MANARO

	C	S	R	A	M	S	T	P
	8	T	O	N	A	T	R	P
	I	A	T	A	N	A	I	L
	Q	A	L	U	B	M	O	T
	T	N						
VARIABLE	x	x	x	x	x	x	x	x
MANARO	x	x	x	x	x	x	x	x
HGUSTE	x	x	x	x	x	x	x	x
HGUSTF	x	x	x	x	x	x	x	x
HGUSTW	x	x	x	x	x	x	x	x
*THRUST	x	x	x	x	x	x	x	x
*TORQUE	x	x	x	x	x	x	x	x
VGUSTE	x	x	x	x	x	x	x	x
VGUSTW	x	x	x	x	x	x	x	x
*YFORCE	x	x	x	x	x	x	x	x
YGUSTF	x	x	x	x	x	x	x	x
ZETATR	x	x	x	x	x	x	x	x

STANR0

VARIABLE	C	S	R	A	M	S	T	P
STANR0	x	x	x	x	x	x	x	x
*R	x	x	x	x	x	x	x	x
J	x	x	x	x	x	x	x	x
W	x	x	x	x	x	x	x	x
H4								
BTP	x	x	x	x	x	x	x	x
IT4	x	x	x	x	x	x	x	x
V45	x	x	x	x	x	x	x	x
LINK	x	x	x	x	x	x	x	x
*PMOM	x	x	x	x	x	x	x	x
QSLF	x	x	x	x	x	x	x	x
*RMOM	x	x	x	x	x	x	x	x
VR0T	x	x	x	x	x	x	x	x
VSND	x	x	x	x	x	x	x	x
YFIN	x	x	x	x	x	x	x	x
ZFFI	x	x	x	x	x	x	x	x
AIRAL	x	x	x	x	x	x	x	x
BIRAL	x	x	x	x	x	x	x	x
C7ND1	x	x	x	x	x	x	x	x
P4C4M	x	x	x	x	x	x	x	x
P4OMT	x	x	x	x	x	x	x	x
P4OMM	x	x	x	x	x	x	x	x
P4OMT	x	x	x	x	x	x	x	x
SMING	x	x	x	x	x	x	x	x
PILGH?	x	x	x	x	x	x	x	x
P4CEL1								

ROSTAR

VARIABLE	C	S	R	A	M	S	T	P
ROSTAR	x	x	x	x	x	x	x	x
A4	x	x	x	x	x	x	x	x
CT	x	x	x	x	x	x	x	x
*FR								
PI	x	x	x	x	x	x	x	x
XB	x	x	x	x	x	x	x	x
ALT	x	x	x	x	x	x	x	x
AOR	x	x	x	x	x	x	x	x
ERH	x	x	x	x	x	x	x	x
*ERX								
EXH	x	x	x	x	x	x	x	x
NXR	x	x	x	x	x	x	x	x
RBH	x	x	x	x	x	x	x	x
SWC	x	x	x	x	x	x	x	x
UHS	x	x	x	x	x	x	x	x
CDHR	x	x	x	x	x	x	x	x
ERTR	x	x	x	x	x	x	x	x
ERXM	x	x	x	x	x	x	x	x
ERXT	x	x	x	x	x	x	x	x
LROT	x	x	x	x	x	x	x	x
RAIB	x	x	x	x	x	x	x	x
RTRP	x	x	x	x	x	x	x	x
TAIR	x	x	x	x	x	x	x	x
CONEK	x	x	x	x	x	x	x	x
DCAFIR	x	x	x	x	x	x	x	x
FVID	x	x	x	x	x	x	x	x
NVARD	x	x	x	x	x	x	x	x
SMKRI	x	x	x	x	x	x	x	x
SMKRZ	x	x	x	x	x	x	x	x
TIP18	x	x	x	x	x	x	x	x
TIP38	x	x	x	x	x	x	x	x
TWIST	x	x	x	x	x	x	x	x
CLRADK	x	x	x	x	x	x	x	x
DELTA3	x	x	x	x	x	x	x	x
LAMBDA	x	x	x	x	x	x	x	x
UPGUST	x	x	x	x	x	x	x	x
URGUST	x	x	x	x	x	x	x	x
UTGUST	x	x	x	x	x	x	x	x
WROTOR	x	x	x	x	x	x	x	x
*XLIMAX	x	x	x	x	x	x	x	x
*XLIMIN	x	x	x	x	x	x	x	x
XLMAXT	x	x	x	x	x	x	x	x
XLMINM	x	x	x	x	x	x	x	x
XLMIINT	x	x	x	x	x	x	x	x

TOPLOT

variable	C	S	R	A	M	S	T	P
TOPLOT	x	x	x	x	x	x	x	x
AH	x	x	x	x	x	x	x	x
AL	x	x	x	x	x	x	x	x
EXIT	x	x	x	x	x	x	x	x
ICON	x	x	x	x	x	x	x	x
IPSN	x	x	x	x	x	x	x	x
NPART	x	x	x	x	x	x	x	x
NTIME	x	x	x	x	x	x	x	x
NVARA	x	x	x	x	x	x	x	x
NVARB	x	x	x	x	x	x	x	x
NVARC	x	x	x	x	x	x	x	x
NVARC5	x	x	x	x	x	x	x	x
NPATINT	x	x	x	x	x	x	x	x
NSCALE	x	x	x	x	x	x	x	x

STARAN

VARIABLE	C	S	R	A	M	S	T	P
STARAN	x	x	x	x	x	x	x	x
RH	x	x	x	x	x	x	x	x
C3	x	x	x	x	x	x	x	x
C4	x	x	x	x	x	x	x	x
RW	x	x	x	x	x	x	x	x
CLP	x	x	x	x	x	x	x	x
CLR	x	x	x	x	x	x	x	x
DCD	x	x	x	x	x	x	x	x
DQL	x	x	x	x	x	x	x	x
DQN	x	x	x	x	x	x	x	x
VIM	x	x	x	x	x	x	x	x
YFS	x	x	x	x	x	x	x	x
RAIB	x	x	x	x	x	x	x	x
CLBO	x	x	x	x	x	x	x	x
CNRD	x	x	x	x	x	x	x	x
FTAO	x	x	x	x	x	x	x	x
NJET	x	x	x	x	x	x	x	x
QFIN	x	x	x	x	x	x	x	x
T2MS	x	x	x	x	x	x	x	x
T2TS	x	x	x	x	x	x	x	x
TIMS	x	x	x	x	x	x	x	x
TITS	x	x	x	x	x	x	x	x
T2WS	x	x	x	x	x	x	x	x
T7TS	x	x	x	x	x	x	x	x
VIER	x	x	x	x	x	x	x	x
CLACL	x	x	x	x	x	x	x	x
CNRCL	x	x	x	x	x	x	x	x
CNPCL	x	x	x	x	x	x	x	x
CNRCD	x	x	x	x	x	x	x	x
CNRCL	x	x	x	x	x	x	x	x
CNLKS	x	x	x	x	x	x	x	x
O3ELF	x	x	x	x	x	x	x	x
FNSMC	x	x	x	x	x	x	x	x
LWING	x	x	x	x	x	x	x	x
PMREL	x	x	x	x	x	x	x	x
PWRMG	x	x	x	x	x	x	x	x
PTRFN	x	x	x	x	x	x	x	x
PPIST	x	x	x	x	x	x	x	x
VMAXF	x	x	x	x	x	x	x	x
YAELF	x	x	x	x	x	x	x	x
YAFRN	x	x	x	x	x	x	x	x
YAFUS	x	x	x	x	x	x	x	x
YALMG	x	x	x	x	x	x	x	x
YAPMG	x	x	x	x	x	x	x	x
APBJET	x	x	x	x	x	x	x	x
ARBJET	x	x	x	x	x	x	x	x
AYBJET	x	x	x	x	x	x	x	x
CNPCL	x	x	x	x	x	x	x	x

STARAN

	C	S	R	A	M	S	T	P
STARAN	x	x	x	x	x	x	x	x
CNP_CD?	x	x	x	x	x	x	x	x
COLJET	x	x	x	x	x	x	x	x
DZM_GFL	x	x	x	x	x	x	x	x
FTA_QMX	x	x	x	x	x	x	x	x
PWG_WK1	x	x	x	x	x	x	x	x
RCWING	x	x	x	x	x	x	x	x
SWING^4	x	x	x	x	x	x	x	x
VENTER	x	x	x	x	x	x	x	x
VXMVER	x	x	x	x	x	x	x	x
YALJET	x	x	x	x	x	x	x	x
YARJET	x	x	x	x	x	x	x	x

APPENDIX F
FORTRAN LISTING

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C ASAJO1 C81 STABILITY AND CONTROL ANALYSIS
C
C PROGRAM CONTROL SECTION
C
C COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
C
C           ,NPART,NVARB,NVARC,NSCALE
C
C           DIMENSION AA(17),IDUM(266)
C           READ (5,2000) AA
C           WRITE (6,1002)
C           DD 2002 I=1,6
C           WRITE (6,2003) AA
C
C 2002 CONTINUE
C           CALL WROUT
C           CALL SETTIME (600.)
C           CALL ERSET (207,2,2,0,0,0)
C           CALL ERSET (208,256,-1,0,0,0)
C           CALL ERSET (209,2,2,0,0,0)
C           NVARS=0
C           EXIT=2.
C           AH(2)=0.
C
C 13 CONTINUE
C           IF(AH(2).EQ.88..AND.EXIT.EQ.1.) CALL A3JUMP
C
C THIS PROGRAM DEPENDS UPON THE VALUE OF NPART FIRST TO DETERMINE
C ITS EXECUTION PROCESS.
C WHEN TWO VALUES OF NPART USE THE SAME SUBROUTINES THE PATHS TAKEN
C IN THE SUBROUTINES ARE DIFFERENT DEPENDING UPON THE VALUES OF
C THE OTHER VARIABLES IN THE PROBLEM.
C
C READ (5,1001,END=70) NPART,NPRINT,NSCALE,NVARA,AL(1),AH(1),
C           NVARB,AL(2),NVARC,AL(3),AH(3)
C
C CHECK NPART TO SEE IF IT IS AN ALLOWABLE VALUE.
C IF IT IS NOT THE PROGRAM IS TERMINATED AFTER ITS VALUE IS WRITTEN.
C
C 14 IF(NPART.GT.11.OR.NPART.LT.1) GO TO 50
C
C IF NPART IS EQUAL TO 10 AFTER AN ERROR OR INITIALLY, THE PROGRAM
C IS TERMINATED IMMEDIATELY.
C
C IF(EXIT.NE.0..AND.NPART.EQ.10) GO TO 70
C           NTIME=-1
C           IF(NPRINT.LE.0) NPRINT=1
C           EXIT=0.
C           GO TO (11,2,3,60,60,60,7,3,60,1C,11),NPART
C
C 1 CONTINUE
C           CALL START
C
C           CHECK EXIT FOR AN ERROR VALUE WHEN CONTROL HAS RETURNED FROM START
C           C810500
C           C810510
C           C810520
C           C810530
C           C810540

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      START A NEW PROBLEM AFTER RETURNING FROM TRIM.          C810055C
      GO TO 13                                              C8100570
      A VALUE OF 2 FOR NPART CONSTITUTES A MANEUVER PROBLEM.    C8100580
      > CONTINUE                                              C8100590
      CALL START                                              C8100620
      IF AN ERROR APPEARS IN EITHER START OR TRIM FLUSH THE MANEUVER
      DATA.                                                 C8100640
      IF(IFIT.NF.0.) GO TO 19                                C8100650
      CALL TRIM                                              C8100660
      IF(IFIT.NF.0.) GO TO 18                                C8100670
      12 CONTINUE                                              C8100680
      CALL MANU                                              C8100690
      IF(IFIT.NE.0..OR.NVARS.EQ.0) GO TO 13                  C8100700
      CALL STAB                                              C8100710
      IF(IFIT.EQ.0.) GO TO 12                                C8100720
      A4=99999999.                                            C8100730
      WRITE (3) IPSN,A4,1DUM                               C8100740
      GO TO 13                                              C8100750
      13 CONTINUE                                              C8100760
      READ (5,1001,END=701) NPART,NPPINT,NSCALE,NVARA,AL(1),AH(1),
      NVARB,AL(2),AH(2),NVARC,AL(3),AH(3)                 C8100770
      1
      IF NPART = 1,2,7. START A NEW PROBLEM
      IF(NPART.EQ.3.OR.NPART.EQ.8) GO TO 18
      IF(NPART.EQ.10) GO TO 70
      IF(NPART.EQ.11) GO TO 21
      GO TO 14
      1
      *FLUSH CURVE FIT DATA (NVARB AND NO DATA CARDS)
      21 READ (5,900) (IDUM(I)),II=1,NVARA)
      IF(NVARB.EQ.0) GO TO 73
      M1>1,IJ=1,NVARS
      READ (5,900) MNUM,ND,(IDUM(I)),II=1,NNUM)
      22 CONTINUE
      23 CONTINUE
      ND=AL(2)+1
      IF(ND.EQ.0) GO TO 18
      DO 24 IJ=1,ND
      READ (5,900) (IDUM(I)),II=1,3)
      24 CONTINUE
      GO TO 18
      3 CONTINUE
      REWIND 3
      CALL PPLOT
      GO TO 13
      1
      C8101080

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C A VALUE OF 7 FOR NPART RESULTS IN THE CALCULATION OF STABILITY
C DERIVATIVES.
C
C 7 CONTINUE
C     CALL START
C     IF(EXIT.NE.0.) GO TO 13
C     CALL TRIM
C     IF(EXIT.NE.0.) GO TO 13
C     CALL STAB
C     GO TO 13
C
C AN NPART VALUE OF 10 RESULTS IN A PARAMETER SWEET USING TRIM OR
C STABILITY DERIVATIVES ONLY.
C
C 10 CONTINUE
C     CALL START
C     IF(EXIT.NE.0.) GO TO 70
C     CALL TRIM
C     IF(EXIT.NE.0.) GO TO 70
C     IF(IVARA.NE.0) CALL STAB
C     IF(EXIT.NE.0.) GO TO 70
C     GO TO 13
C
C A VALUE OF 11 FOR NPART RESULTS IN A LEAST SQUARES CURVE FIT OF
C TIME HISTORY DATA.
C
C 11 CONTINUE
C     REWIND 3
C     CALL CURVET
C     GO TO 13
C     60 WRITE (6,1000)NPART
C     70 STOP
C
C 902 FORMAT (14I5)
C 1000 FORMAT (1H1,18X,'BELL HELICOPTER IAH OS/350 PROGRAM ASAJ01')
C 1          1H 17X39MHHELIOTER RIGID BODY DYNAMICS ANALYSIS/////////
C 2          23H DATA ERROR ** NPART = .15)
C 1001 FORMAT (12,X,13,3X,11,3(15.5X,2F5.0))
C 1002 FORMAT (1H1)
C 2000 FORMAT (17A4)
C 2103 FORMAT (1H0,17X,17A4/////////)
C
C FND
C
C 1410
C 1420
C 1430
C 1440
C 1450
C 1460
C 1470
C 1480
C 1490

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SUBROUTINE AJACOB
COMMON /FORCE/ XF,XFRMG,XFFLG,XFFELE,XFFUS,XFRJET,
1 XF3JET,XFMR,XFTX,AFGUN,XFFIN,XFW,
2 YF,YFFUS,YFRJET,YFLJET,YFMR,YFTR,
3 YFGUN,YFFIN,YFW,
4 ZF+ZFRMG,ZFLMG,ZFELE,ZFFUS,ZFRJET,
5 ZFLJET,ZFAR,ZFTR,ZFGUN,ZFW,
6 QL+LLRG,LLMG,LELE,LRLJET,LLJET,
7 LMR,LTR,LGUN,LFIN,LQMR,LQTR,
8 QM+MRMG,MLMG,MELE,MFUS,MRJET,MLJET,
9 NMR,NTR,NGUN,NFIN,NQMR,NOTR,
ON,NRNG,NLNG,NELE,NFUS,NRJET,NLJET,
NMR,NTR,NGUN,NFIN,NQMR,NOTR
A COMMON /STR1AB/
B COMMON /STR1AB/
1 D(21),DT(21),E(12),F(12),G(12),
DL,DM,DN,DY,DY,DZ,IY,IY,I2,PD(10,11),
2 DTR,EPD,ERR(10),KMI,RHO,
3 R12,SPD(6,6,3),XBM(21),XEL(14),
4 XER(17),XFC(26),XFN(7),XFS(35),
5 XGN(7),XIT(21),XQR(49),XTR(49),
6 XMG(21),YMR(21),YTR(21),YNG(21),
7 YEL(21),YFN(21),BLCG,DAMP,DEPD(10),
8 EPDS,EPDX(10),MASS,OSV,TMRS,TTRS,
9 WLGS,XCOM(63),XJET(14),XMIN,AYEFP,
A BETAES(2),CNPCD,DHADQ,DYDR,GUESS,
B YPASS,PDPH(12,11),STACG,TZERO,
C XMAST,DHADQ,QQDCOL,DTRSQ,DYBDR,
D ENGRPM,XPASS,PSD30P,TRINDL,XLIMIT
E AY,VH,AGW,DT,(21),DT(2)(2),IX2,
F QMR,XXD,YD,ZZD,ALGF,APPF,AVFP,
G CGWL,COLL(6),CYCF(3),CYCL(3),
H DIST,KCIT(20),PEDA(3),QMAX,
I QMRS,TIME,TMAX,XCIT(20,6),ALGEZ,
J ALGE1,ALGE2,CGSTA,CPMIC,DIX12,
K DIVIX,DIZY,DTZMT,DTZM1,DTZT1,FTKTS,
L HUBKM(2,2),HUBKI(2,2),
M KREAD,PIU30,TSTA(14),ZMAX2,ZMAX3,
N ASECOL,CYPVIC,GEARAT,PSD550,
O PSTP,QBRAK,RUDIND,ZDELT1,ZDELT2
P QAP,PED,QMG,T2M,TIM,T2M,
1 T2T,T1T,T2T,ALEL,CZET,PSDD,
2 SZET,TAXL,TAXR,XAMG,XLNK(16),ZAMG,
3 ALCYP,ALFIN,ALLMG,ALRMG,CDELE,CDFIN,
4 CDLMG,CDRMG,CLELE,CLFIN,CLLMG,CLRMG,CMING,
5 CYCR1,CYCR2,CZET4,CZET6,CZET9,RANGE,
6 SZET5,SZET7,SZET8,WGCOL,XAELE,XAFIN,
7 XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,
* YAELE,YAFUS,YALMG,YARNG,YARJET,YARJET,
8 ZAJET,ALECR1,ALGFPD,BOTTOM,CZET11,
9 CZET12,CZET13,E1ZETA,HALFPT,SZET10,
A XAPYLD,YGUSTW,ZAPYLD,ZFLWG1,ZFRWGI
B *TZMS,TIMS,TZTS,TITS,T2TS,
C CLOCK,FLOCK,XLOCK,TCLOCK
* ZZ,VXS(2),VYS(2),VZS(2),BETA(12,2),
T,PCC(2),COS(7,7,2),BETA(2),BETAZ(2),BETAZ(2),
* AJAC0010
* AJAC0020
* AJAC0030
* AJAC0040
* AJAC0050
* AJAC0060
* AJAC0070
* AJAC0080
* AJAC0090
* AJAC0100
* AJAC0110
* AJAC0120
* AJAC0130
* AJAC0140
* AJAC0150
* AJAC0160
* AJAC0170
* AJAC0180
* AJAC0190
* AJAC0200
* AJAC0210
* AJAC0220
* AJAC0230
* AJAC0240
* AJAC0250
* AJAC0260
* AJAC0270
* AJAC0280
* AJAC0290
* AJAC0300
* AJAC0310
* AJAC0320
* AJAC0330
* AJAC0340
* AJAC0350
* AJAC0360
* AJAC0370
* AJAC0380
* AJAC0390
* AJAC0400
* AJAC0410
* AJAC0420
* AJAC0430
* AJAC0440
* AJAC0450
* AJAC0460
* AJAC0470
* AJAC0480
* AJAC0490
* AJAC0500
* AJAC0510
* AJAC0520
* AJAC0530
* AJAC0540

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* A1B(2),APDD,ARD0,AYDD,AIR(2).
1 DPSI(12,2),DTTR,NPSI(2),ZZTR.
2 BETAD(12,2),BNPSI(2).
3 COND2,GRAXY,RATE1,RATE2,STOP2,
4 THROT(2),TRIND,XGUST,BETAZD(2),CMAXVI.
5 GMAXV2,GRAXV3,GUSTYP,BETAZD(2),CMAXVI.
6 HUBKPS,HUBKRS,MU8TPS,MU8TRS,
7 KOMFIG,LNGTH1,PILGH1,PSIREF(2).
8 START2,XMONL1(12,2),
9 R.M,RT,RN,DRN,ORT,TINT,TITT.
A T2MT,T2TT,T2NT,XMAIL,XMAIL.
B XMB1,XMB1T,AIBPM,AIBRM,AIBRT.
C APTD,APTD,ARTD,ARTD,ARTD,PSD,PSDT.
D XSTAHH,XSTAHT,YSTAHH,YSTAHT.
E HUBKP,HUBKTP,HUBKR,HUBKTR
F *AZETA,AZETAT,VZETA,VZETAT
1 *BETA(2),MGUSTF,MGUSTF,MGUSTW,MGUSTE,
2 MGUSTW,MGUSTF,GFND,GLAT,GVERT.
3 VGB,VZB,APD,VYB,ARD,AYD.
4 COLSTK,CYSTKL,CYSTK2,PEDAL,AYE.
5 APE,ARE,AIM,BIM,AITR,BITR,
6 XARI(2),YARI(2),ZARI(2).
7 VIMR,VITA,ZETA,ZETAT,RHM,RHM,RHM.
8 TMR,TR,OMX,OTR,YMRF,YTRF
COMMON /MANARO/ J,W,ITM,VHS(2),LINK,QUEL,VROT(2).
1 VSND,YFIN(2),ZFEL(2),ALBAL(2).
2 BIAL(2),CND1,SWING,PILGH2,PNGELI.
3 BM,BTR,PNORM,PNOMT,PNOMM,PNOMT
AH(3),AL(3),EXIT,ICOM(49),IPSN,
4 MPART,NVARB,NVARC,NSCALE
1 *NVARS,NPRINT,NTIME
1 DIMENSION VAR(111)
1 EQUIVALENCE (VAR(1),COLSTK)
1 CYCR1=CYSTK1*CYCF(3)+CYCF(2)
1 CYCR2=CYSTK2*CYCL(3)+CYCL(2)
1 PED= PEGAL*PEDA(3)+PEDA(2)
1 WGCOL=CPMIC*COLSTK+AGN
1 ALCR1=ALGE2+CYCR1*(ALGET+ALGE2*CYCR1)
1 ALCYP=CPMIC*CYCR2
1 ALGFPD=ALGF+RUDIND*PED
1 CALL SWASICOLSTK()
1 TZMT=TZM+DTZM1+DTZMT+ASECOL
1 TZTT=TZT+DTZT1+TRIND*(DTZNT+ASECOL)
1 TINT=TIM+DTI(1)
1 TITT=TIT+DTI(2)
1 T2MT=T2M+DT2(1)
1 T2TT=T2T+DT2(2)
1 CALL RATS (XXD,YDD,ZZD,AYE,APE,ARE,VXB,VYS,VIB,-1)
1 IF(LINK.EQ.2) CALL OFFTRM
1
C CALL ANAL
C IF(EXIT.NE.0.) RETURN

```

```

F(1) = XF - DX
F(2) = YF - DY
F(3) = ZF - DZ
F(4) = ON - DN
F(5) = OM - DM
F(6) = QL - DL
F(7)=XMB1
F(8)=XMA1
F(9)=XMBIT
F(10)=XMAILT
IF(ICND1.LE.1.5.AND.J.NE.1) RETURN
IF(ICND1.LE.1.5.AND.LINK.EQ.3) RETURN
IF(ICND1.EQ.0.) RETURN
CALL WRVP (1,VAR,KM1,PD,TAXL,TAXR)
CALL WRFN
PFTJPN
END

```

AJAC1020
AJAC1100
AJAC1110
AJAC1120
AJAC1130
AJAC1140
AJAC1150
AJAC1160
AJAC1170
AJAC1180
AJAC1190
AJAC1200
AJAC1210
AJAC1220
AJAC1230
AJAC1240
AJAC1250

SUBROUTINE ANAL

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COMMON /FORCE/ XF,XFRNG,XFLWG,XFELE,XFFUS,XFRJET.
1 XFLJET,XFTR,XFGUN,XFFIN,XFM.
2 YF,YFFUS,YFRJET,YFLJET,YFMR,YFTR.
3 YFGUN,YFFIN,YFM.
4 ZF,ZFRNG,ZFLWG,ZFELE,ZFFUS,ZFRJET.
5 ZFLJET,ZFTR,ZFGUN,ZFM.
6 QL,LRG,LNG,LELE,LFUS,LRIET,LLJET.
7 LMR,LTR,LGUN,LFIN,LQMR,LOTR.
8 OM,MRNG,MLNG,MELE,MFUS,MRJET,MLJET.
9 MMR,MTR,MGUN,MFIN,MOMR,MQTR,
  ON,MRNG,MLNG,NELE,MFUS,NRJET,NLJET.
A NMR,NTR,NGUN,NFIN,NQMR,NQTR
  A COMMON /MANAL/
1  O/AP,APD,OWG,T2M,T1M,T2M.
2  T2T,T1T,T2T,ALEL,CZET,PSJD.
3  SZET,TAXI,TAXR,XANG,XLINK(16),ZANG.
4  ALCP,ALFIN,ALLWG,ALRWG,COELE,COFIN,
  COLWG,CORGW,CLELE,CLFIN,CLRWG,CLWING.
5  CYCRL,CYCR2,CZET4,CZET6,CZET9,RANGE.
6  SZETS,SZET7,SZET8,WGCOL,XAELE,XAFIN,
  XAFUS,XAJET,XAFIN,ZAELE,ZAFIN,ZAFUS.
7  YAEL,YAFUS,YALWG,YARLG,YALJET,YARJET.
8  ZAJET,ALECR1,ALGFDP,BOTTOM,CZET11.
9  CZET12,CZET13,EIZETA,HALFP1,SZET10.
A  XAPYLD,YGUSTW,ZAPYLD,ZFLWG1,ZFRWG1
6  *TZMS,TIMS,T2MS,TZTS,T1TS,T2TS.
C  CLOCK,FLLOCK,XLOCK,TCLOCK
1  I,V,IND,NWAG,APMT,ARBM,AYBMT,BETA0(2),TOELT.
2  BETA0(2),HGUSTE,HGUSTW,HGUSTW,VGUSTE.
3  VGUSTW,YGUSTF,GFMD,GLAT,GVERT.
4  VXB,VZB,APD,VYB,ARD,AYD,
  COLSTK,CYSTK1,CYSTK2,PEDAL,AYE.
5  APE,ARE,AIM,BIM,ALTR,BITR,
  XAR(2),YAR(2),ZAR(2).
6  VIMR,VITR,ZETA,ZETATE,MHR,MTR,
  TMR,TTR,OMX,OTR,YMRF,YTRF.
7  J,W,ITM,VHS(2),LINK,QUE,VROT(2).
1  VSND,YF IN(2),ZFEL(2),AIBAL(2),
  BIBAL(2),COND1,SWING,PILGH2,PWGEI1,
  RM,BTR,PMOMM,PMOMT,PMOMM,PMOMT
2  ICOMMON /STANRO/
3  AH(3),AH(3),EXIT,ICOM(49),IFSN,
4  NPART,INVAR,INVARC,INSCALE
5  INVARS,INPRINT,NTIME
6  BH(2),C3,C4,RW,CLP,CLR,DCD,DQD,DMN,VIM.
7  BAIB(2),CLBD,CNRD,ETAQ,INJET,
8  OFIN,
9  VIER,CBLCL,YFS(14),
10  CNBCL,CNPCL,CNRCD,CNRCL,COLKS,D3ELE,
11  FNSWC,LWING,PMREL,PMRWG,
12  PTRFN,RPST,VMAXE,YAERD(31.5),
13  APBJET,ARBJFT,AYBJET,
14  CNPCD1,CNPCCD2,CLNJET,DWNGEL,DZNGEL,
15  ETAQMX,PNGWK1,RCMING,SMINGH,
16  VENTER,VMMVFR
A

```

```

COMMON /AFORY/ V(4,15,1)
REAL LELE, LFIN, LGUN, LHURK, LLJET, LLWG, LMR,
1    LMR, LOTR, LRJET, LRWG, LTR, MELE, MFIN, MFUS,
?    MGUN, MHURKT, MLJET, MMR, MPYL, MQMR,
3    MOTR, MRJET, MRWG, MTR, NELE, NFIN, NFUS, NGUN, NLWG,
4    NHURK, NHURKT, NLJET, NMAR, NOMR, NATR, NRJET,
5    NRWG, NTR, LFUS, NFFUS, MF-US
5    V3=0.
      MP=M*COS(APE)
      XFW=-M*SIN(APE)
      YFM=MP*SIN(LARE)
      ZFM=MP*COS(LARE)
      GFMD=(XFM-XF)*RN
      GLAT=(YFM-YF)*RN
      GVERT=(ZFM-ZF)*RN
      IF(BM.EQ.0.) GO TO 300
      CALL ROTAN (1)
      IF(EXIT.NE.0.) RETURN
      CALL RATS (XAR(1),YAR(1),ZAR(1),XFMR,ZFMR,1)
      OREACT=OMX+BAIBULI*PSDD
      CALL MICE (n.,OREACT,-ZETA,LQMR,NQMR,-1)
      PMOMH=PMOMH+BH11
      CALL RATS (RMOMH,PMOMH,0.,0.,-ZETA,n.,LHURK,MQMR,NHURK,1)
      LOMP=LOMR+LHURK
      NQMR=NQMR+NHURK
      IF(VROT(1).NE.0.) V3=(VHS(1)/VPNT(1))*3
300  IF(BTR.EQ.0.) GO TO 299
      CALL ROTAN (2)
      IF(EXIT.NE.0.) RETURN
      CALL RATS (-HTR,YTR,-TTR,AVBMT,APBMT,XFBMT,YFTR,ZFTR,1)
      CALL RATS (XAR(2),YAR(2),ZAR(2),XFTR,YFTR,ZFTR,MTR,NTR)
      OREATT=QTR+BAIB(2)*PSDD
      CALL RATS (0.,0.,-OREATT,AVBMT,APBMT,XFBMT,LOTR,MOTR,NOTR,1)
      PMOMH=PMOMT+BH12
      RMOMH=RMOMT+BH12
      CALL RATS (RMOMH,PMOMH,0.,AVRMT,APBMT,XFBMT,LOTR,MOTR,NOTR,1)
      1
      1
      LOTR=LOTR+LHURKT
      MOTR=MOTR+MHURKT
      NOTR=NOTR+NHURKT
      209  XMAC=V*VSND
          AP=0.
          APDOT=0.
          VX2BSQ=VXB**2+VZB**2
          IF(VX2BSQ.EQ.0.) GO TO 303
          AP=ATAN2(VZB,VXB)
          APDOT=(VXB*Y(1.78)-VZB*Y(1.76))/VX2BSQ
C   WING EQUATIONS
C   303 CONTINUE
C   ANG=0.

```

```

IF (QNG.LT.Q) GO TO 304
V1W=V1M*PWRNG
XXW=VXB-MGUSTW-V1W*SZET
ST1=V2B-VGUSTW-V1W*CZET
ANGRW=ATAN2(ST1,XXW)
ALGEO=ANGRW+WGCOL
ALRMG=ALGEO+ALCYP
CALL CLCD (ALRMG, CLRNG, CDRNG, XMAC, EXIT, 3)
IF (EXIT.NE.0.) GO TO 1
CD=C3
CL=C4
DCDR=DCD
VELSO=XXW**2+ST1**2
ORW=QMG*VELSO
CALL MICE 1-CDRWG,-CLRNG,ANGRW,C1+C2,1)
XFRMG=C1*QRW
ZFRMG=C2*QRW
CALL DOGS (XANG,YARG,ZANG,XFRNG,0. *ZFRNG,LRNG,MRNG,MRNG)
ALLMG=ALGEO+ALCYP
CALL CLCD (ALLWG, CLLMG, CDLMG, XMAC, EXIT, 3)
IF (EXIT.NE.0.) GO TO 1
CD=.5*(C3+CD)
CLMG=.5*(C4+CL)
ALWG=-.5*(ALRG+ALLWG)
DCD=.5*(DCDR+DCD)
CALL MICE 1-CDLGW,-CLLGW,ANGRW,C1+C2,1)
XFLMG=C1*QRW
ZFLMG=C2*QRW
CALL DOGS (XANG,YALWG,ZANG,XFLNG,0. *ZFLNG,LLNG,MLNG,NLJGI)
TS=SWINGH/SORT(VELSO)
FF=QRW*SWINGH
YAW=0.
IF (VYB-YGUSTW.NE.0..OR.XXW.NE.0..) YAW=ATAN2(VYB-YGUSTW,XXW)
DOL AND DON ARE CONTRIBUTION OF EACH WING. NOT TOTAL
DQL=FF*(YAW*(CLB0+CLBC1*CLMG)+TS*(LAYD*CLR*CLWG*ARD*CLP))
DON=FF*(YAW*(CNB0+CNBC1*CLMG)+TS*(LAYD*(CNRCL*CLMG*2+CNRC0*DOL))
1 +ARD*(CNPC1*CLMG+CNPCD1+CNPCD2*ALNG))
LLNG=LLNG+DQL
LRNG=LRNG+DQL
NRNG=NRNG+DON
NLNG=NLNG+DON
ANGE=-PWGEL1*CLNG
ANG1=0.
IF (VXB.NE.0..) ANG1=APDOT*XAEELF+PWGEL1/VXB
IF (ALWG.EQ.0..) GJ TO 305
ANGE=ANGE-ANG1*CLNG/ALWG
GO TO 306
305 CONTINUE
ANGE=ANGE-ANG1*YAERO117,3)
306 CONTINUE
AWAKE=PWGWL1*CLNG
DSTALL=RPIST*AMAX1(0..(ALNG-YAERO(19,3)))

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XA=DXWGEL-DSTALL
AWGEL=ATAN2(DZWGFL.XA)
DWGEL=SORT(XA**2+DZWGEL**2)*RCWING
ANGIF=AWAKE-AP-AMGEL
DIS=DWGEL*ABS(SIN(ANGLE))
XI=DWGEL*ABSCOS(ANGLE)
HWAKE=-.68*SORT(CD*(XI+.15))
ETAQ=0.
IF(DIS.LT.HWAKE.AND. ABS(ANGLE).LT.HALFPI)
1 ETAQ=ETAQ*XSORT(CD)/(XI+.3)*(COSDIS *HALFPI/HWAKE))**2
(FNWAG.EQ.0) GO TO 304
LWING=LWING+
LWING1=LWING
DI(IF=ZFRWG-ZFRWG1
CALL WAG ICWING.LWING.3.V.TDELT.RED.DLIFT)
ZFRWG=ZFRWG-RED
DLIFT=ZFLWG-ZFLWG1
CALL WAG ICWING.LWING1.4.V.TDFLT.RED.DLIFT)
ZFLWG=ZFLWG-RED

ELEVATOR EQUATIONS
304 IF(QELE.LT.QI GO TO 302
VIER=0.
IF(V.GT.VENTER) VIER=VIMR*(V-VENTER)**VXMER
1 IF(V.GT.VMAXE) VIFR=PMREL*VIMR
ST1=VZB+ARD*YAELE-APD*XAEE-VIER*CZET-VGJSTE
XXE=VXB+APD*ZAEE-AVD*YAELE-HUGUSTE
VELSO=XXE**2+ST1**2
1 IF(VFLSQ.NE.0.) ANGE=ATAN2(ST1.XXE)+ANGE
ALEL=ALECR1+D3ELE*COLSTK+EIZETA+ANGE
CALL CLCD 1ALEL.CLFLE.CDELE.XMAC.EXIT+.4)
1 IF(EXIT.NE.0.) GO TO 1
JE=D3ELE*VELSQ*(1.-ETAQ)
1 IF(4FL.NE.0.) CLELF=CLELE*ALEL/(ALEL+CLELE*QE*YAERO(11.+4))
CALL MICE 1-CDELE,-CLELE,ANGE,C1.C2.1)
XFELE=C1*QE
ZFELE=C2*QE
CALL DOGS (XAEE.YAELE.ZAELE.XFELE.0. .ZFELE.LELE.MELE.NELE)
1 IF(NWAG.EQ.0) GO TO 302
2 FEL(?)=ZFELE
ZFELE=.5*(ZFEL(1)+ZFEL(2))
1 IF(1.NE.3) ZFEL(1)=ZFEL(2)

FIN EQUATIONS
307 IF(QFIN.LT.QI GO TO 301
ST1=ARD*ZAFIN-AYD*XAFIN-VYB*FNSMC-VITR*PTRFN+YGUSTF
XXFN=VXB+APD*ZAFIN-AYD*YAFIN-HGUSTF
QF=QF(IN*(XXFN*XXFN+ST1*ST1)
ANGF=0.
1 IF(QF.NE.0.) ANGF=ATAN2(ST1.XXFN)
ALF(IN=ANGF+ALGFPD
CALL CLCD 1ALFIN.CLFIN.CDFIN.XMAC.EXIT.5)

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IF(EXIT.NE.0.) GO TO 1
IF(ALFIN.NE.0.) CLFIN=CLFIN*ALFIN/(ALFIN+CLFIN*OF*YAERO(11.5))
CALL MICE (-C0FIN,CLFIN,ANGF,C1,C2,-1)
XFFIN=C1*OF
YFFIN=C2*OF

CALL DOGS (XAFIN,YAFIN,ZAFIN,XFFIN,YFFIN,0. •LFIN,MFIN,NFIN)

1 IF(NMAG.EQ.0) GO TO 301
YFIN(2)=YFFIN
YFFIN=.5*(YFIN(1)+YFIN(2))
IF(1.NE.3) YFIN(1)=YFIN(2)

C FUSFLAGE EQUATIONS
C
301 XF=VXB-HGUSTW
ST1=VZB-VGUSTW
ANG1=0.

QVXZB=0*(XXF*XXF+ST1*ST1)
IF(QVXZB.NE.0.) ANG1=ATAN2(ST1*XXF)
FSLIFT=QVXZB*(YFS(1)+ANG1*YFS(2))
DF=QVXZB*(YFS(7)+ANG1*(YFS(8)+ANG1*YFS(9)))
ST2=YGUSTW-VYB
QVXYB=0*(XXF*XXF+ST2*ST2)
ANG2=0.

IF(QVXYB.NE.0.) ANG2=ATAN2(ST2*XXF)
YFFS=QVXYB*(YFS(10)+ANG2*(YFS(11)+ANG2*YFS(12)))
DFAY=QVXYB*YFS(13)*ANG2**2
CALL MICE (-DF,-FSLIFT,ANG1*XFFUS*ZFFUS-1)
CALL MICE (-OFAY,YFFS,ANG2,XFFUSY,YFFUS,-1)
DPLYON=QVZB*YFS(14)*V3
CALL MICE (-DPLYON,0.,ANG1,XFPYL,ZFPYL,1)
XFFUS=XFFUS+XFPYL+XFFUSY
ZFFUS=ZFFUS+ZFPYL

CALL DOGS (XAPYLD,0.,ZAPYLD,XFPYL,0.,ZFPYL,TY,MPYL,TY1)
CALL DOGS (YAFUS,ZAFUS,XFFUS,YFFUS,ZFFUS,LFFUS,MFFUS)
MFUS=QVZB*(YFS(3)+ANG1*YFS(4))+MPYL+MFFUS
YFUS=QVXYB*(YFS(5)+ANG2*YFS(6))+NFFUS

C JET THRUST EQUATIONS
C
IF(COLJET.EQ.0.) GO TO 79
DCOL=COLJET*(COLSTK-COLKS)
COLKS=COLSTK
TAXR=TAXR+OCOL
IF(INJET.EQ.1) GO TO 79
TAXL=TAXL+OCOL

79 CONTINUE
CALL RATS (TAXR,C,0,AIRJET,ARBJET,XFRJET,YFRJET,ZFRJET,1) ANAL2170
CALL DOGS (XAJET,YARJET,ZAJET,XFRJET,YFRJET,ZFRJET,LRJET,MRJET,
1 NRJET) ANAL2180
ANAL2190
ANAL2200
ANAL2210
ANAL2220
ANAL2230
ANAL2240
ANAL2250
ANAL2260
ANAL2270
ANAL2280
ANAL2290
ANAL2300
ANAL2310
ANAL2320
ANAL2330
ANAL2340
ANAL2350
ANAL2360
ANAL2370
ANAL2380
ANAL2390
ANAL2400
ANAL2410
ANAL2420
ANAL2430
ANAL2440
ANAL2450
ANAL2460
ANAL2470
ANAL2480
ANAL2490
ANAL2500
ANAL2510
ANAL2520
ANAL2530
ANAL2540
ANAL2550
ANAL2560
ANAL2570
ANAL2580
ANAL2590
ANAL2600
ANAL2610
ANAL2620
ANAL2630
ANAL2640
ANAL2650
ANAL2660
ANAL2670
ANAL2680
ANAL2690
ANAL2700

C FURCF EQUATIONS
C

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C   XF=XFRWG+XFLWG+XXFELE+XFFUS+XFRJET+XFLJET+XFMR+XFTR+XFGUN+XFFIN+XFWANAL2710
YF=          YFFUS+YFLJET+YFLJET+YFMR+YFTR+YFGUN+YFFIN+YFWANAL2720
ZF=ZFRWG+ZFLWG+ZZFELE+ZFFUS+ZFRJET+ZFLJET+ZFRJET+ZFMR+ZFTR+ZFGUN+ZFWANAL2730
          ANAL2740
C   C   MOMENT EQUATIONS
C   QL=LRWG+LLWG+LELE+LFUS+LRJET+LLJET+LMR+LTR+LGUN+LFIN+LQMR+LQTR
QM=MRWG+MLWG+MELE+MFUS+MRJET+MLJET+MMR+MTR+MGUN+MF1N+MQMR+MQTR
QN=NRWG+NLWG+NELE+NFUS+NRJET+NLJET+NMR+NTR+NGUN+NF1N+NQMR+NQTR
          ANAL2750
          ANAL2760
          ANAL2770
          ANAL2780
          ANAL2790
          ANAL2800
          ANAL2810
          ANAL2820
          ANAL2830
          ANAL2840
C   C   1 RETURN
      END
C   C

```

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SUBROUTINE CATS (A1,A2,A3,B1,B2,B3,C1,C2,C3,N1,N2)
C
C   A IS THE MATRIX OF THE A SET OF EULER ANGLES
C   B IS THE MATRIX OF THE B SET OF EULER ANGLES
C   C IS THE MATRIX OF THE C SET OF EULER ANGLES
C
C   N1= 1, N2= 1 IS FOR B*A
C   N1=-1, N2= 1 IS FOR B*B(TRANSPOSE)
C   N1= 1, N2=-1 IS FOR B*BT(TRANSPOSE)*A
C   N1=-1, N2=-1 IS FOR B(BTRANSPOSE)*A(TRANSPOSE)
C
C   DIMENSION A(3,3),B(3,3),C(3,3)
C
C   COMPUTE A AND B MATRICES
C   CALL MATRIX (A1,A2,A3,A*N1)
C   CALL MATRIX (B1,B2,B3,B*N2)
C   COMPUTE C MATRIX
      DO 101 I=1,3
      DO 101 J=1,3
      C(I,J)=0.
      DO 101 L=1,3
      C(I,J)*=C(I,L)*B(L,J)*A(I,L)
101  CONTINUE
C
C   CHECK TO SEE IF PITCH ANGLE IS 90 DEGREES
      IF(C(1,1).EQ.0..AND.C(1,2).EQ.0.) GO TO 104
      C1=ATAN2(C(1,2),C(1,1))
      C3=ATAN2(C(2,3),C(3,3))
      CC3=COS(C3)
      IF(ABS(CC3).LE.0.001) GO TO 102
      C2=ATAN2((-C(1,3)*CC3),C(3,3))
      GO TO 103
102  CONTINUE
      C2=ATAN2(-C(1,3)*(C(2,3)*SIN(C3)))
103  CONTINUE
C
C   CHECK TO SEE IF C1,C2,C3 ARE IN WRONG QUADRANT
      IF(COS(C2).GE.0.) RETURN
      RECOMPUTE C1,C2,C3 IN CORRECT QUADRANT
      C1=ATAN2(-C(1,2),-C(1,1))
      C3=ATAN2(-C(2,3),-C(3,3))
      IF(ABS(CC3).LE.0.001) RETURN
      C2=ATAN2(-C(1,3)*COS(C3),C(3,3))
      RETURN
C
C   RESOLVE INDETERMINACY CAUSED BY PITCH ANGLE BY USING OLD
C   YAW ANGLE
104  CONTINUE
      C2 = -SIGN(1.570796*C(1,3))
      C3=ATAN2(-C(2,1),(-C(1,3)*C(3,1))-C1)*C(1,3)
      RETURN
END

```

```

SUBROUTINE CLCJ (ALP,CL,CO,XMAC,EXIT,N)
COMMON /STARAN/ RH(2),C3,C4,RW,CLP,CLR,DCD,DQL,DQN,VIN,
     BAI(2),CLB0,CNRD,ETAQ,NJET,
     QFIN,
     VIER,CLBCL,YFS(14),
     CNBCL,CNPCL,CNRCD,CNRCL,COLKS,03EL,E,
     FNSWC,LWING,PWREL,PWRNG,
     PTRFN,RPST,VMAXE,YAERO(31,51),
     APBJET,ARBJET,AJBJET,
     CNPCD1,CNPCD2,CLLJET,DXWGEI,OZNGEL,
     ETAMMX,PNGMK1,RCWING,SWINGH,
     VENTER,VXMER
      DIMENSION HEAD(3,31)
      DATA DTRR,PI,TWJPI / 57.29576,3.141593,6.283185/
      DATA HALFPI/1.570796/
      DATA HEAD/ .
      WING   ELEVATOR FIN/RUDDER  /
      LOGICAL STALL
      STALL=.FALSE.
      ALF=ALP
      AL=YAERO(17,N)
      SG=1.
      IF(ALF.LT.0.) SG=-1.
      AMG=SG*ALF
      IF(20.LE.AMG) GO TO 6015
      IF(PI.GE.AMG) GO TO 6020
      AMG=AMG-TWOPI
      ALF=AMG*SG
      GO TO 6C10
      6C15 WRITE (6,6101) N
      EXIT=1.
      RETURN
6C20 IF(AL.NE.0.) GO TO 50
      ALD=AMG+OTRR
      CALL TARINT (CL,CD,XMAC,ALD,SG)
      CL=CL*SG
      RETURN
5C SMAC=1./SORT(ABS(1.-XMAC**2))
      AL=0.
      CRM=YAERO(1,N)
      SSMH=YAERO(2,N)
      CO2=YAERO(12,N)
      C01 = YAERO(13,N)
      C02 = YAERO(14,N)
      C0M=YAERO(16,N)
      SMAL4 = AMIN1(XMAC,SSMM)
      AR = YAFRO(18,N)
      ALD=ALP+OTRR
      ZK3=1.+25*XMAC**4
      IF((HALFPI).GE.AMG) GO TO 6032
      AMG=PI-AMG
      SG=-SG
      CLZ=YAERO(7,N)
      CLMX=CLZ+SMALH*(YAERO(8,N)+SMALH*(YAERO(9,N)+SMALH*(YAERO(10,N))))
      ALB=YAERO(23,N)
      CLCD0010
      CLCD0020
      CLCD0030
      CLCD0040
      CLCD0050
      CLCD0060
      CLCD0070
      CLCD0080
      CLCD0090
      CLCD0100
      CLCD0110
      CLCD0120
      CLCD0130
      CLCD0140
      CLCD0150
      CLCD0160
      CLCD0170
      CLCD0180
      CLCD0190
      CLCD0200
      CLCD0210
      CLCD0220
      CLCD0230
      CLCD0240
      CLCD0250
      CLCD0260
      CLCD0270
      CLCD0280
      CLCD0290
      CLCD0300
      CLCD0310
      CLCD0320
      CLCD0330
      CLCD0340
      CLCD0350
      CLCD0360
      CLCD0370
      CLCD0380
      CLCD0390
      CLCD0400
      CLCD0410
      CLCD0420
      CLCD0430
      CLCD0440
      CLCD0450
      CLCD0460
      CLCD0470
      CLCD0480
      CLCD0490
      CLCD0500
      CLCD0510
      CLCD0520
      CLCD0530
      CLCD0540

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SALB=YAFRD(21,N)
S2ALB=YAEFD(25,N)
CALB=YAFRD(27,N)
GO TO 6031
6032 CL2=YAERD(3,N)
CLMX=CL2+SMALM*(YAERD(4,N)+SMALM*(YAERD(5,N)+SMALM*YAERD(6,N)))
ALB=YAFRD(22,N)
SALB=YAFRD(20,N)
S2ALB=YAFRD(24,N)
CALB=YAFRD(26,N)
6031 IF(XMAC.LT.CRM) GO TO 6041
IF(SSMM.LE.XMAC) GO TO 6042
AL=YAERD(29,N)+XMAC*(YAERD(30,N)+XMAC*YAERD(31,N))
GO TO 5000
6041 AL=SAL*SMAC
GO TO 5000
6042 AL=SAL*SMAC
5000 ANG=AMG
ALPHI4=CLMX/AL
SAMG=$IN(AMG)
CAMG=COS(AMG)
IF(N.LT.3) GO TO 11
F1=CLZ
F2=.81
GO TO 10
11 F1=.938
F2=.581
1^ CONTINUE
IF(ALB.GT.AMG) GO TO 6044
STALL=.TRUE.
IF(XMAC.GT.1.0) ZK3=.844+.082/(XMAC-.8)
IF(ABS(SAMG).GE.1.565) GO TO 35
QC=F1*ZK3
Q1=QN+QN
A=Q0*SIN(AMG+AMG)
22=.81+Q1*SAMG-F2*ZK3
B02A=(AR-SAMG*Q2+Q1*CAMG**2)/(A+A)
COA=CAMG*Q2/A
DISC=SORT(B02A**2+COA)
IF(B02A.GT.0.) GO TO 31
ALI=DISC-B02A
GO TO 36
31 CONTINUE
ALI=COA/(B02A+DISC)
30 TO 36
35 ALI = 0.
36 CL = AR * ALI
GO TO 20
6044 ALI = AL/(AL+ARI)*AMG
ANG=AMG-ALI
CL=AL*ANG
IF(CLMX.GE.CLI) GO TO 20
20=F1*ZK3
Q1=QQ+QQ

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```

A=Q0*S2ALB
Q2=.81+01*SALB-F2*ZK3
B02A=IAR-SALB*02+01*CALB**2)/(A+A)
COA=CALB*Q2/A
DISC=SORT(B02A**2*COA)
IF(B02A.GT.0.) GO TO 32
ALIB=DISC-B02A
GO TO 33
32 CONTINUE
      ALIB=COA/(B02A+DISC)
33 CONTINUE
      CLB = AR + ALIB
      ALIMX = CLMX/(AR + AL)
      AOVER = (ANG-ALPH14)/(ALPH14-ALB)
      ALI = ALIMX*(ALIMX-ALIB)*ADVER
      CL = CLMX*(CLMX-CLB)*AOVER
      ANG=ANG-ALI
      STALL=.TRUE.
20 CL=CL*SG
      IF(1.0.LE.XMAC) GO TO 6050
      CDZ = CDZ*SMAC
      XMACM = AMAX1(XMAC,.35) - CRM
      IF(ALPH14.LT.ANG) GO TO 60
      DD = XMACH + 1.9*AMG
      C5=1.9
      IF(DD.GE.0.) GO TO 30
      C5=0.
      DD=0.
30 CONTINUE
      C6=AMG*CD2
      C7=CD1 + C6
      CD=CDZ+AMG*C7+DD
      IF(CD.GT.CONX1) GO TO 70
      DC0=C5+C6-C7
      GO TO 253
70 CONTINUE
      CDSX=CDMX
      AS1 = CD1 + 1.9
      AS2 = CD2 - CDSX + XMACH
      IF(CD2.E0.0.) GO TO 80
      ALFSX = (SQR(T1.25*AS1*AS1 - AS2*CD2)
      GO TO 6040
      80 CONTINUE
      ALFSX = -AS2/AS1
      GO TO 6040
60 CONTINUE
      CDSX=CDZ+ALPH14*(CD1 + ALPH14*CD2
      1 AMAX1(0.,XMACH + 1.9*ALPH14)
      IF(CDSX.GT.CDMX) GO TO 70
      ALFSX=ALPH14
      6040 CONTINUE
      IF(1.LT..3) GO TO 40
      C5=AMG-HALFP1
      C6=C5*(CDSX-2.0)/(HALFSX-HALFP1)**2

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CD=C5*C6*2.0
DCD=C5*C6
30 TO 254
40 CONTINUE
2K4=2.1*2K3
CALF=1./COS(1ALFSX)
SALF=CALF* SIN(1ALFSX)**2
CALF=COSX*CALF
CD=2K4*SAMG**2+(CALF-SALF*2K4)*SAMG
RETURN
6050 CD=CDMX
DCD=0.
IF (SSMM.GT. XMAC) GO TO 253
CD=4.* (AMG**2+YAERO(15,N))*SMAC+CD2
DCD=8.*AMG*SMAC
6060 IF (CD.LE.CDMX) GO TO 253
CD=CDMX
DCD=0.
253 IF (NLT.3) RETURN
254 CONTINUE
IF (STALL) WRITE (6,22) (HEAD(J,N-2),J=1,3),ALD,CL,CD
C3=CD
C4=CL
NSGG = -SG
CALL MICE (C3,C4,ALI,CD,CL,NSGG)
RETURN
22 FORMAT (1HO.3A4,'STALLED AT ',F7.3,' DEGREES CL = ',F6.3,' CD = ',F6.3)
1   6101 FORMAT ('0 EXCESSIVE ANGLE OF ATTACK FOR N = ',I2)
END

```

SUBROUTINE CCMSOL(COFF,RPRT1,ZPRT2,ZPRT2)

SOLUTION OF SIMULTANEOUS EQUATIONS
WITH COMPLEX COEFFICIENTS

N = ORDER OF MATRIX

DIMENSION COEF(12,3),A(2,5)

COMPLEX A,TEMP,DET,COEF

N=2

NP1 = 3

DO 3J = 1,NP1

DO 3I = 1,N

A(I,J) = COEF(I,J)

3 CONTINUE

COLUMNAR REARRANGEMENT OF MATRIX

NM1=N-1

DO 60 I=1,NM1

JJ=I+1

IMAX=I

AMAXT = REAL(A(JJ,I))**2 + AIMAG(A(JJ,I))**2

DO 29J=JJ,N

ATFST1 = REAL(A(JJ,I))**2 + AIMAG(A(JJ,I))**2

ATEST2 = REAL(A(IMAX,I))**2 + AIMAG(A(IMAX,I))**2

IF(ATEST1-ATEST2) 29,29,28

IF(ATEST1.LE.AMAXT) GO TO 29

AMAXT = ATEST1

IMAX = J

29 CONTINUE

IF(IMAX=I) 60,60,33

31 DET=-DET

DO 50K=1,NP1

TEMP=A(I,K)

A(I,K)=A(IMAX,K)

A(IMAX,K)=TEMP

50 CONTINUE

60 CONTINUE

C AUGMENT INPUT MATRIX WITH THE IDENTITY MATRIX

NP2 = 4

N2P1 = 5

DO 10 I=1,N

DO 11 J =NP2,N2P1

A(I,J) = 0.0

11 CONTINUE

12 CONTINUE

DO 13 I = 1,N

J = I + NP1

A(I,J) = 1.0

13 CONTINUE

C

COMS0010
COMS0020
COMS0030
COMS0040
COMS0050
COMS0060
COMS0070
COMS0080
COMS0090
COMS0100
COMS0110
COMS0120
COMS0130
COMS0140
COMS0150
COMS0160
COMS0170
COMS0180
COMS0190
COMS0200
COMS0210
COMS0220
COMS0230
COMS0240
COMS0250
COMS0260
COMS0270
COMS0280
COMS0290
COMS0300
COMS0310
COMS0320
COMS0330
COMS0340
COMS0350
COMS0360
COMS0370
COMS0380
COMS0390
COMS0400
COMS0410
COMS0420
COMS0430
COMS0440
COMS0450
COMS0460
COMS0470
COMS0480
COMS0490
COMS0500
COMS0510
COMS0520
COMS0530
COMS0540

SOLUT'ON

```
      DO 19 I=1,N
     1 IP1 = I+1
     2 TTEST = REAL(A(I,I))**2 + AIMAG(A(I,I))**2
     3 IF(TTEST.LE.0.000001) GO TO 99
 12  DO 15 J = IP1,N2P1
     1 A(I,J) = A(I,J)/A(I,I)
 15  CONTINUE
     DO 18 K = 1,N
     1 IF(K-I) 16,18,16
 16  DO 17 J = IP1,N2P1
     1 A(K,J) = A(K,J) - A(K,I)*A(I,J)
 17  CONTINUE
 18  CONTINUE
 19  CONTINUE

C DETERMINANT EVALUATION
      DO 20 I = 1,N
     1 DET = DET * A(I,I)
 20  CONTINUE
     REPR1 = REAL(A(1,3))
     ZPRT1 = AIMAG(A(1,3))
     REPR2 = REAL(A(2,3))
     ZPRT2 = AIMAG(A(2,3))
     RETURN

C SINGULAR MATRIX
      DO 99 I=1,N
     1 PRINT 999,I,I,A(I,I)
 999  FORMAT (1/3H A(.,I2.1H.,I2.4H) = .2F10.8 )
 94  FORMAT(7E12.4)
     RETURN
     END
```

```

SUBROUTINE CON1 (XCON,D3ELE,TRIND,COLJET,FIMAST,PGCDEF,PGCMAX)
COMMON /STRIM/ AY,VH,AGH,DT1(12),DT2(2),IX2,
                 DMR,XXO,YYO,ZZD,ALGF,APFP,AYFP,
                 CGNL,COLL(6),CYCF(3),CYCL(3),
                 DIST,KCIT(20),PEDA(3),OMAX,
                 QMRS,TIME,TMAX,XCIT(20,6),ALGEZ,
                 ALGE1,ALGE2,CGSTA,CPMIC,OIXIZ,
                 OIVIX,OIZIY,OTZMT,OTZML,OTZTI,FTKYS,
                 HUBKM(2,2),HUBKI(2,2),
                 KREAD,PIU30,TSTAB(14),ZMAX2,ZMAX3,
                 ASECOL,CYPMIC,GFARAT,PSOS50,
                 PSISTP,QXBRAK,RUDINO,ZOELT1,ZOELT2
a COMMON /MANAL/
1          *AP,PEQ,QMG,TZM,TIM,T2M,
2          TZT,T1T,T2T,ALFL,CZFT,PSDD,
3          SZET,TAXL,TAXR,XANG,XLNK(16),ZANG,
4          ALCYP,ALFIN,ALLWG,ALRWG,COELE,COFIN,
5          COLWG,CDRWG,CLELE,CLFIN,CLLWG,CLRWG,CWING,
6          CYCRL,CYCRL2,CZET4,CZET6,CZET9,RANGE,
7          SZETS,SZET7,SZFT8,WGCOL,XAEL,E,XAFFIN,
8          XAJET,YAFIN,ZAEL,ZAFIN,ZAFUS,
9          YAEL,E,YAFUS,YALWG,YARMG,YALJET,YARJET,
10         ZAJET,ALECR1,ALGFPO,BOTJ3M,CZET11,
11         CZET12,CZET13,FIZETA,HALFPI,SZET10,
12         XAPYLO,YGUSTW,ZAPYLO,ZFLWG1,ZFRWG1
13         ,T2HS,T1MS,T24S,T2TS,T1TS,T2TS,
14         CLOCK,FLOCK,XLOCK,TCLOCK
C DIMENSION XCON(63)
DATA OTR,OTRR,PO10TR/ .1745329F-01,57.29578,.1745329E-01/
15         /
SET UP VALUES FOR COLLECTIVE
16         C C
COLL(1)=XCON(1)
17         IF(COLL(1)=EQ.0.) COLL(1)=100.
18         C C
COLL(2)=XCON(12)*DTR
19         C C
COLL(3)=XCON(3)
20         C C
COLL(4)=XCON(4)*DTR
21         C C
COLL(5) = XCON(5)
22         C C
IF(COLL(5)=EQ.0.) COLL(5) = 100.
23         C C
XXX = XCON(6)
24         C C
IF(XXX=EQ.0.) XXX=COLL(5)
25         C C
SLOPE OF RANGE
26         C C
COLL(6)=(XXX-COLL(5))/HALFPI
27         C C
CLOCK=XCON(7)
28         C C
TZMS=XCON(8)*DTR
29         C C
CPMIC=XCON(10)*COLL(1)*PD10TR
30         C C
D3ELE=XCON(11)*COLL(1)*PD10TR
31         C C
COLJET=XCON(12)*COLL(1)/100.
32         C C
SET UP VALUES FOR F/A CYCLIC
33         C C
CYCF(1)=XCON(15)
34         C C
IF(CYCF(1)=EQ.0.) CYCF(1)=100.
35         C C
CON10010
CON10020
CON10030
CON10040
CON10050
CON10060
CON10070
CON10080
CON10090
CON10100
CON10110
CON10120
CON10130
CON10140
CON10150
CON10160
CON10170
CON10180
CON10190
CON10200
CON10210
CON10220
CON10230
CON10240
CON10250
CON10260
CON10270
CON10280
CON10290
CON10300
CON10310
CON10320
CON10330
CON10340
CON10350
CON10360
CON10370
CON10380
CON10390
CON10400
CON10410
CON10420
CON10430
CON10440
CON10450
CON10460
CON10470
CON10480
CON10490
CON10500
CON10510
CON10520
CON10530
CON10540

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CON10550
CON10560
CON10570
CON10580
CON10590
CON10600
CON10610
CON10620
CON10630
CON10640
CON10650
CON10660
CON10670
CON10680
CON10690
CON10700
CON10710
CON10720
CON10730
CON10740
CON10750
CON10760
CON10770
CON10780
CON10790
CON10800
CON10810
CON10820
CON10830
CON10840
CON10850
CON10860
CON10870
CON10880
CON10890
CON10900
CON10910
CON10920
CON10930
CON10940
CON10950
CON10960

CYCF(2)=XCON(16)*DTR
IF(CYCF(2).EQ.0.) CYCF(2)=-.8726646
CYCF(3)=XCON(17)*P01DTR
IF(CYCF(3).EQ.0.) CYCF(3)=DTR
FLOCK=XCON(18)
T1MS=XCON(19)*DTR
T1TS=TIMS*TRIND
RDPIN=CYCF(1)/(100.*CYCF(3))
ALGE1=XCON(27)*RDPIN*DTR
ALGE2=XCON(28)*RDPIN**2*DTR

SET UP VALUES FOR LATERAL CYCLIC
CYCL(1)=XCON(29)
IF(CYCL(1).EQ.0.) CYCL(1)=100.
CYCL(2)=XCON(30)*DTR
IF(CYCL(2).EQ.0.) CYCL(2)=-.8726646
CYCL(3)=XCON(31)*P01DTR
IF(CYCL(3).EQ.0.) CYCL(3)=DTR
XLOCK=XCON(32)
T2MS=XCON(33)*DTR
T2TS=-T2MS*TRIND
CYPWIC=XCON(41)*CYCL(1)/(100.*CYCL(3))*DTR

SET UP VALUES FOR PEAOI
PEOA(1)=XCON(43)
IF(PEOA(1).EQ.0.) PEOA(1)=100.
PEOA(2)=XCON(44)*DTR
IF(PEOA(2).EQ.0.) PEOA(2)=-.8726646
PEOA(3)=XCON(45)*P01DTR
IF(PEOA(3).EQ.0.) PEOA(3)=DTR
TCLOCK=XCON(46)
T2TS=XCON(47)*DTR

MISC. VALUES
PCGMAX=XCON(13)*DTR
PGGDE0=XCON(14)
QUIND=XCON(48)
FIMAST=XCON(63)
RETURN

```

```

SUBROUTINE CON2 (XCON, XLNK, KONFIS, RUDIND)
DATA DTR / -1745329E-01 /
DIMENSION XCON(63), XLNK(16)
XLNK(12)=XCON(25)
XLNK(13)=XCON(26)
IF (KONFIG.NE.1) GO TO 10
XLNK(2)=1.
IF (RUDIND.EQ.0.) GO TO 11
RUDIND=1.
XLNK(2)=XCON(58)
11 DD=DTR*RUDIND
XLNK(1)=XCON(57)*DD
XLNK(3)=XCON(59)*DD*DTR
RETURN
10 XLNK(1)=XCON(24)
XLNK(2)=XCON(40)
XLNK(3)=XCON(9)
DO 13 I=1,3
IF (XLNK(I).EQ.0.) XLNK(I)=1.
13 CONTINUE
IF (KONFIG.EQ.3) GO TO 12
XLNK(4)=XCON(23)
XLNK(5)=XCON(22)
XLNK(6)=XCON(55)
XLNK(7)=XCON(54)
RETURN
12 XLNK(4)=XCON(37)
XLNK(5)=XCON(51)
XLNK(6)=XCON(36)
XLNK(7)=XCON(50)
XLNK(8)=XCON(39)
XLNK(9)=XCON(53)
XLNK(10)=XCON(38)
XLNK(11)=XCON(52)
XLNK(14)=XCON(60)
XLNK(15)=XCON(61)
XLNK(16)=XCON(62)*DTR
RETURN
END

```

```

SUBROUTINE CURVET
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICDM(49),JPSN,
NPART,NVARB,NVARC,NSCALE
      ,NVARS,NPRINT,NTIME
      COMMON /PLOTO/ HEAD(9,267)
      DIMENSION A(266),NC(266),AMP(266),PHI(266),SUM1(266),
      S1=12(266),SUM3(266),SUM4(256),COEF(266),NUMC(266),
      REAL*X,Y,B,S1,S2,S3,S4,S5,SUM1,SUM2,SUM3,SUM4,
      DIFF1,DIFF2,DIFF3,DIFF5,DIFF6,DENOM,CON1,CON2,CON3,DIFF7
      CALL TIMEX (TUSED,TLEFT,TLEFT)
      DTR=.174532925E-01
      DTRR=.2957795
      TWOP1=6.283185307
      INITAILIZE VARIABLE SUMS
      DO 10 I=1,254
      NC(I)=0
      SUM1(I)=0.
      SUM2(I)=0.
      SUM3(I)=0.
      SUM4(I)=0.
      SUM4(I)=0.
10 CONTINUE
      READ CODES FOR VARIABLES TO BE FIT
      READ (5,900) (NC(I),I=1,NVARA)
      SKIP TRANSIENT POINTS
      ON 11 I=1,NVARC
      READ (3) JPSN,T,A
      READ (3) JPSN,T,A
11 CONTINUE
      TSTART=T
      CHANGE INPUT CPS TO RAD/SEC AND INITAILZE TIME SUMS
      OMEGA=AL(1)*TWOP1
      S1=0.
      S2=0.
      S3=0.
      S4=0.
      S5=0.
      KOUNT=0
998 READ (3,END=999) JPSN,T,A
      IF(T.GT.9.E+07) GO TO 999
      OT=OMEGA*T
      X=STIN(OT)
      Y=COS(OT)
      COMPUTE SUMS WHICH ARE CONSTANT WRT VARIABLES AND COUNT POINTS
      S1=S1+X
      S2=S2+Y
      S3=S3+X*X
      S4=S4+Y*Y
      S5=S5+X*Y
      KOUNT=KOUNT+1
      COMPUTE SUMS DEPENDENT UPON EACH VARIABLE
      DO 12 J=1,NVARA
      I=NC(J)
      R=AL(I)
      SUM1(I)=SUM1(I)+R
      SUM2(I)=SUM2(I)+R*X
12 CONTINUE
      CURVO010
      CURVO020
      CURVO030
      CURVO040
      CURVO050
      CURVO060
      CURVO070
      CURVO080
      CURVO090
      CURVO100
      CURVO110
      CURVO120
      CURVO130
      CURVO140
      CURVO150
      CURVO160
      CURVO170
      CURVO180
      CURVO190
      CURVO200
      CURVO210
      CURVO220
      CURVO230
      CURVO240
      CURVO250
      CURVO260
      CURVO270
      CURVO280
      CURVO290
      CURVO300
      CURVO310
      CURVO320
      CURVO330
      CURVO340
      CURVO350
      CURVO360
      CURVO370
      CURVO380
      CURVO390
      CURVO400
      CURVO410
      CURVO420
      CURVO430
      CURVO440
      CURVO450
      CURVO460
      CURVO470
      CURVO480
      CURVO490
      CURVO500
      CURVO510
      CURVO520
      CURVO530
      CURVO540

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```

XK2=XK1*SIN3
XK3=XK1*SIN1
BK=XR2/AMP(NIN1)
CK=XR3/AMP(NIN2)
DK=C(NDEP)-BK*C(NIN1)-CK*C(NIN2)
      WRITE (6,906) (HEAD(K,NDEP),K=1,9),(HEAD(K,NIN1),K=1,9),BK
      WRITE (6,906) (HEAD(K,NIN2),K=1,9),CK,DK
      GO TO 16
      17 WRITE (6,907) (HEAD(K,NIN1),K=1,9),(HEAD(K,NIN2),K=1,9)
      16 CONTINUE
      101 CALL TIMEX (TUSED,TOELT,TLEFT)
      WRITE (6,905) TOELT,TUSED
      RETURN
      900 FORMAT (1415)
      901 FORMAT (1HO/1H .32X, 'LEAST SQUARES CURVE FIT STARTING AFTER'.
      1          F7.3, ' SECONDS MANEUVER TIME'//1H .23X,
      1          'FIT' - AMPLITUDE*SIN(OMEGA* + PHASE ANGLE) + CONSTANT*
      2          10X, 'WITH OMEGA = ' F6.3, ' CPS //'
      2          1H .20X, 'VARIABLE' ,23X, 'AMPLITUDE' ,6X,
      3          'PHASE ANGLE (DEGREES)' ,7X, 'CONSTANT' ,11X, 'COEF OF CORR' )
      3          CURV1270
      4          902 FORMAT (1HO/6X,9A4*4(6X,G15.5))
      4          CURV1280
      903 FORMAT (1HO/.1H .48X, 'AMPLITUDE AND PHASE ANGLE COMPARISONS' //
      1          1H .39X, 'VARIABLES' ,39X, 'AMPLITUDE RATIO' ,3X,
      2          'PHASE ANGLE DIFFERENCE')
      2          CURV1310
      904 FORMAT (1HO/7X,9A4, ' /' ,9A4*2(7X,G15.5))
      905 FORMAT (1HO/10X,F10.3, ' MINUTES USED IN CURVE FITTING' ,
      1          F10.3, ' MINUTES TOTAL COMPUTING TIME')
      906 FORMAT (1HO/30X, 'A' ,10X,9A4/
      1          1H .30X, 'B' ,10X,9A4,10X,G15.5/
      2          1H .30X, 'C' ,10X,9A4,10X,G15.5/
      3          1H .69X, 'CONSTANT' ,10X,G15.5)
      150
      907 FORMAT (1HO/10X, 'THE PHASE ANGLE DIFFERENCE BETWEEN ' ,9A4, ' AND ' ,CURV1400
      1          9A4/1H .10X, 'IS A MULTIPLE OF 180 DEGREES. THEREFORE, NO VCURV1410
      1          VARIABLE CAN BE EXPRESSED AS A LINEAR FUNCTION OF THEM.' )
      908 FORMAT (1HO/1H .35X, 'VARIABLE ' ,A, ' AS A LINEAR COMBINATION OF VACURV1430
      1          IRIBLES ' ,B, ' AND ' ,C, ' //1H .56X, 'A = KB*C + KD//1H .
      2          27X, 'VARIABLE ' ,22X, 'NAME' ,28X, 'COEFFICIENT' )
      END
      CURV1450
      CURV1460

```

```

C SURROUNTING CALL LIBRARY UPDATING *****
C COMMON /STOPLNT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
C           NPART,NVARA,NVARB,NVARC,NSCALE
C           NVARS,NPRINT,NTIMEF
C DIMENSION A(266)

C READ DATA CARD IN C81-11 DRIVER...
C   NPART = 8      (TO GET IN HERE)
C   NSCALE=       (TO SPECIFY WHICH LIBRARY PATH)

C NPATH = 0        TO DUMP TIME HISTORY DATA ON TAPF 9
C   READ SINGLE TIME-HISTORY FROM (3),
C   WRITE TIME HISTORY ON 9
C   NPATH = 1 IS FOR LAST JOB THIS TERMINATES TAPE 9
C NPATH = 2 IS FOR PULLING DATA FROM 9 AND WRITING IT ON 3

C TO PULL A SPECIFIC :PSN FOR RE-PLOTTING (INPATH=2),
C USE COMMENT CARDS WHICH WERE ON DECK WHEN T-H WAS MADE
C ***** DO NOT CHANGE IPSN ON FIRST COMMENT CARD *****
C ***** C81L0250 ***** C81L0260 *****

C CALL TIMEX (TUSED,TOELT,TLEFT)
C NPATH = NSCALE
C NPSN=0
C WRITE(6,202)
C IF(INPATH,LT,0,OR,INPATH,GT,2) GO TO 130
C IF(INPATH,FQ,2) GO TO 10C
C TRANSFER T-H FROM 3 TO 9
C 203 READ (3) JPSN,T,A
C 25 WRITE(9,21) JPSN,T,A
C IF(T,LT,.999,E+04) GO TO 203
C WRITE(6,204) JPSN
C IF(INPATH,EQ,0) GO TO 207
C T=.8888888,E+01
C WRITE (9,21) JPSN,T,A
C FNOFILE 9
C 207 REWIND 9
C GO TO 600
C 100 READ (5,1011) IPSN,ICOM
C           SEARCH OLD MASTER FOR T-H TO PLOT
C 110 READ (6,21) JPSN,T,A
C IF(8888.E+04,LT,T.AND.T,LT,.9999,E+04) GO TO 140
C IF(NPSN,EQ,JPSN) GO TO 115
C NPSN=JPSN
C WRITE (6,205) NPSN
C 115 IF(IPSN,NE,JPSN) GO TO 110
C           WRITE T-H ON TAPE 3
C 120 WRITE (3) JPSN,T,A

```

```

IF(T.LT.9999.E+04) GO TO 110
WRITE(6,206) NPSN
ENDFILE 3
REWIND 8
GO TO 600
140 WRITE(6,14)
GO TO 600
130 WRITE(6,13)
500 CALL TIMEX (TUSED,TDELT,TLEFT)
WRITE(6,601) TDELT
RETURN
13 FORMAT (' NSCALE HAS ILLEGAL VALUE')
14 FORMAT(3OH IPSN INDICATED NOT ON LIBRARY )
21 FORMAT (19.2E12.5/(10E12.5))
202 FORMAT (1H1.18X,12HPROGRAM C01L/14X,20HTIME HISTORY LIBRARY //
1          48H    ON      PULLED FROM   PUT ON   /
2          48H    LIBRARY TAPE  LIBRARY TAPE  SCRATCH TAPE  )
204 FORMAT(34X,I12)
205 FORMAT(I14)
206 FORMAT (18X,I12)
601 FORMAT(1H /24H TIME USED WITHIN C01L ~, F5.2+5H MIN.)
1011 FORMAT (2X,I8,15A4/17A4/17A4)
END

```

C01L0550
C01L0560
C01L0570
C01L0580
C01L0590
C01L0600
C01L0610
C01L0620
C01L0630
C01L0640
C01L0650
C01L0660
C01L0670
C01L0680
C01L0690
C01L0700
C01L0710
C01L0720
C01L0730
C01L0740
C01L0750
C01L0760
C01L0770

```

SUBROUTINE DAMPER
COMMON /STRIAB/ D(21),DT(21),E(79),F(10),X(10),
1   OL,OM,DX,DY,DZ,IX,IY,IZ,PD(10,11),
2   DTR,EPD,ERR(10),KML,RHO,
3   R12,SPD(6,3),XBW(21),XEI(14),
4   XER(7),XFC(28),XFM(7),XFS(35),
5   XGN(7),XIT(21),XMR(49),XTR(49),
6   XWG(21),YMR(21),YTR(21),YWG(21),
7   YEL(21),YFN(21),BLCG,DAMP,DEPD(10),
8   EPDS,EPDX(10),MASS,QSV1,TMRS,TRSR,
9   WLCG,XCOM(63),XJET(14),XMIN,AYEFPP,
A   DETAES(2),CMPCD,DHADQ,DYBDR,GUESS,
B   NPASS,PDPH(10,11),STACG,TZERO,
C   XMAST,DHADAO,DQOCOL,DTRSSQ,DYBDBR,
D   ENGRPM,MXPASS,PSD30P,TRIND1,XLIMIT
XLIMIT=.5*XLIMIT
IF(XLIMIT.LT.XMIN) XLIMIT=XMIN
EPD=.5*XLIMIT
1 IF(EPD.LT.-1745329E-03) EPD=-1745329E-03
DO 2 I=1,9
2 DEPD(1)=EPD*EPDX(1)
CONTINUE
2 DEPD(10)=-EPD
RETURN
END

```

```

DAMPO010
DAMPO020
DAMPO030
DAMPO040
DAMPO050
DAMPO060
DAMPO070
DAMPO080
DAMPO090
DAMPO100
DAMPO110
DAMPO120
DAMPO130
DAMPO140
DAMPO150
DAMPO160
DAMPO170
DAMPO180
DAMPO190
DAMPO200
DAMPO210
DAMPO220
DAMPO230
DAMPO240
DAMPO250

```

BLOCK DATA

COMMON /METER/ PARM1(10,6),PARM2(10,6),PARM3(10,6),
 PARM4(10,6),PARM5(10),PARM6(10,6),PARM7(10,2),
 COMMON /PLOTO/ PLOT10(9,7),PLOT27(9),PLOT11(9,7),PLOT28(9),
 PLOT12(9,7),PLOT29(9),PLOT13(9,7),PLOT30(9),
 PLOT14(9,7),PLOT31(9),PLOT15(9,7),PLOT32(9),
 PLOT16(9,7),PLOT33(9),PLOT17(9,7),PLOT34(9),
 PLOT18(9,6),PLOTC(9,5),
 PLOT19(9,6),PLOTE(9,6),PLOTF(9,6),PLOTG(9,5),
 PLOTH(9,6),PLOTI(9,6),PLOTK(9,5),
 PLOTL(9,7),PLOTM(9,7),
 PLOT19(9,7),PLOT20(9,7),PLOT21(9,7),
 PLOT22(9,7),PLOT23(9,7),PLOT24(9,7),
 PLOT25(9,7),PLOT26(9,7),
 PLOTP(9,6),PLOTQ(9,6),PLOTR(9,6),PLOTS(9,5),
 PLOTT(9,6),PLOTU(9,6),PLOTV(9,6),PLOTW(9,5),
 PLOTX(9,6),PLOTY(9,6),PLOTZ(9,6),PLOTO(9),
 DATA PARM/ * ROTOR COLLECTIVE PITCH (DEGREES) WING ANGLE (DEGREES) DATA0090
 1 IF ATTACK (DEGREES) F/A CYCLIC PITCH (DEGREES) DATA0100
 2 BODY Z-FORCE (+DOWN) (LBSS) LAT CYCLIC PITCDATA0200
 3H (DEGREES) BODY X-FORCE (+FWD) (LBSS) / DATA0120
 DATA PARM/ DATA0130
 4/A FLAPPING (DEGREES) ELEVATOR ANGLE OF ATTACK (DEGREES) DATA0230
 5) LAT FLAPPING (DEGREES) BODY Z-FORCE (DEGREES) DATA0240
 6(+DOWN) (LBSS) THRUST (LBSS) DATA0250
 7 BODY X-FORCE (+FWD) (LBSS) / H-FORCE (LBSS) DATA0260
 DATA PARM/ DATA0270
 A) FIN ANGLE OF ATTACK (DEGREES) RUDDER ANGLE OF ATTADATD0290
 9CK (DEGREES) BODY Y-FORCE (+RIGHT) (LBSS) BODDATD0300
 A0Y Y-FORCE (+RIGHT) (LBSS) BODY Y-FORCE (+RIGHT) (LBSS) DATA0310
 BBS) / DATA0320
 DATA PARM/ DATA0330
 C+FWD) (LBSS) BODY X-FORCE (+FWD) (LBSS) BODY X-FORCE (DAT00340
 D RPM HELICOPTER EULER ANGLE YAW (DDATD0350
 DEGREES) DATA0360
 DATA PARM/ MAST TILT ANGLE (DEGREES) / DATA0370
 F PITCH(DEGREES) BLADE INERTIA (SLUG-FT-SO) DATA0380
 H (LBSS) ROLL (DEGREES) JET THRUST, LEFT SIDE DATA0390
 I. RIGHT SIDE (LBSS) RATE OF CLIMB (FT/SEC) DATA0400
 DATA PARM/ DATA0410
 1GROSS WEIGHT PCT CONTROL USED COLLECTIVE FORWARD SPEED (KNOTS) * / DATA0430
 2 ENGINE RPM DATA0440
 3T CYCLIC C.G. STATION LINE (IN) / DATA0460
 DATA PARM/ DATA0470
 4 PEDESTAL DATA0480
 5 / WATER LINE (IN) DATA0490
 DATA0500
 DATA PLOT10 / * Q VELOCITY, TPP1, DEG/SEC. TDATD0510
 1P1, DEG/SEC U VELOCITY, MAST1 AXES, FT/SEC DMEGA-DODATD0520
 2T, ROTOR1, DEG/SEC/SEC BETA-2DNT, BLADE1, ROTM1, OEG/SEC/SEC RODATD0530
 3TOR1 THRUST, LB F/A FLAPPING, MAST1/TPP1, OEG DAT00540

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4 /*
DATA PLOT27
4 /, LATERAL FLAPPING, MAST1/TPP1, DEG /*
DATA PLOT11 /, V VELOCITY, MAST1 AXES, FT/SEC OMEGA, ROTOR1, BLADE1, ROTOR1, DEG/SEC ROTOR1, MDAT0590
10EG/SEC
2-ENRCE, LB
3IMUTH LOC., BLADE1, ROTOR1, DEG BLADE1, ROTOR1, DEG MAST1 AXES, FT/SEC AZDAT0600
4 /*
DATA PLOT28
4 /* ROTOR1 Y-FORCE, LB /*
DATA PLOT12 /, ROTOR1 COLLECTS. FROM CONTROLS, DEG ROTOR1 F/A CYCDAT0650
1. FROM CONTROLS, DEG ROTOR1 LAT CYC. FROM CONTROLS, DEG ROTOR1 CDA00660
2NING, DEG
3TOR1 TORQUE, FT-LB
4 /*
DATA PLOT29
4 /* ROTOR1 OTHER F/A CYC., DEG /*
DATA PLOT13 /, ROTOR1 OTHER LAT CYC.. DEG
1 VELOCITY, FT/SEC ROTOR1 RPM ROTOR1 INDUCEDDAT0720
2NSEPOWER ROTOR1 UPPER FLAPPING LIMIT, DEG RODAT0740
3TOR1 F/A HUMSPRING, FT-LB/DEG ROTOR1 TOTAL COLLECTIVE, DEG DATC0680
4 /*
DATA PLOT30
4 /* ROTOR1 TOTAL F/A CYCLIC, DEG /*
DATA PLOT14 /, ROTOR1 TOTAL LAT CYCLIC, DEG ROTOR1 LOWER FDAT00790
1LAPPING LIMIT, DEG ROTOR1 LAT HUMSPRING, FT-LB/DEG Q VELOCIDAD0800
2TY, TPP2, DEG/SEC TPP2, DEG/SEC U DATD0810
3VELOCITY, MAST2 AXES, FT/SEC OMEGA-DOT, ROTOR2, DEG/SEC/SEC DA00820
4 /*
DATA PLOT31
4 /* BETA-2DDOT,BLADE1,ROTOR2,DEG/SEC/SEC */
DATA PLOT15 /, ROTOR2 THRUST, LA f/a FLAPPING, DAT00850
1MAST2/TPP2, DEG LATERAL FLAPPING, MAST2/TPP2, DEG V VELOCIDAD0870
2TY, MAST2 AXES, FT/SEC OMEGA, ROTOR2, DEG/SEC DEDATD0880
3TA-DOT, BLADE1, ROTOR2, DEG/SEC ROTOR2 H-FORCE, LB DATD0890
4 /*
DATA PLOT32
4 /* W VELOCITY, MAST2 AXES, FT/SEC /*
DATA PLOT16 /, AZIMUTH LOC., BLADE1, ROTOR2, DEG BETA, BLADE1, DATD0930
1ROTOR2, DEG ROTOR2 Y-FORCE, LB ROTOR2 OTHER COATD1000
2JLLEC, FROM CONTROLS, DEG ROTOR2 F/A CYC. ROTOR2 CDA00940
3TOR2 LAT CYC., DEG FROM CONTROLS, DEG ROTOR2 CONING, DEG RODAT0950
4 /*
DATA PLOT33
4 /* MAST2 TILT, DEG /*
DATA PLOT17 /, ROTOR2 TORQUE, FT-LB ROTOR2 OTHER COATD1000
1COLLEC., DEG ROTOR2 OTHER F/A CYC., DEG ROTOR2 COATD1019
2THER LAT CYC., DEG ROTOR2 INDUCED VELOCITY, FT/SEC RODAT01020
3TOR2 RPM ROTOR2 HORSEPOWER DATD1030
4 /*
DATA PLOT34
4 /* ROTOR2 UPPER FLAPPING LIMIT, DEG /*
DATA PLOT18 /, ROTOR2 F/A HUMSPRING, FT-LB/DEG ROTOR2 TOTAL CDATD1070
1COLLECTIVE, DEG ROTOR2 TOTAL F/A CYCLIC, DEG ROTOR2 TDATD1080

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2 TOTAL LAT CYCLIC. DEG ROTOR2 LOWER FLAPPING LIMIT. OEG
 3 ROTOR2 LAT HUBSPRING. FT-LB/DEG
 DATA PLOT2 /
 A . X-COMP VELOCITY. FIXED AXES. FT/SEC Y-CDMP VELOCITY. FIXED AXE
 B. FT/SEC Z-COMP VELOCITY. FIXED AXES. FT/SEC TOTAL DISTANCE FLOWN. DATA01130
 C FT AIR SPEED. KTS ,/
 DATA DPLOT/ * HEADING ANGLE. OEG
 1IXEO AXES. FT Y-COMP OISP.. FIXED AXES. FT X-COMP DISP.. FDAT01150
 2SP.. FIXED AXES. FT ALTITUDE. FT Z-COMP DIA0T01160
 3UND SPEED. KTS ,/
 DATA PLOT /
 4 U-DOT ACCEL.. BODY AXES. FT/SEC SEC V-DOT ACCEL.. BODY AXES. FT0AT01200
 5/SEC SEC W-DOT ACCEL.. BODY AXES. FT/SEC SEC P-DOT ACCEL. BODY AXE DAT01210
 6S. DEG/SEC SEC Q-DOT ACCEL. BODY AXES. DEG/SEC SEC /
 DATA PLOT /
 7DY AXES. DEG/SEC SEC COLLEC. BOOMT. ACCEL.. DEG/SEC SEC U VELDCIT0AT01230
 BY. BODY AXES. FT/SEC V VELOCITY. BODY AXES. FT/SEC W VDAT01250
 9ELOCITY. BODY AXES. FT/SEC P VELOCITY. BODY AXES. DEG/SEC DAT01260
 A ,/
 DATA PLDTG /
 A . O VELOCITY. BODY AXES. DEG/SEC R VELOCITY. BODY AXES. DEG/ DAT01290
 BSEC COLLEC. BOOMT. VELOCITY. DEG/SEC YAN VELOCITY. FIXED/B DAT01300
 CODY. DEG/SEC PITCH VELOCITY. FIXED/BODY. DEG/SEC /
 DATA PLOT/H * ROLL VELOCITY. FIXED/BODY. DEG/SEC YAN ANGLE. FIXED/DAT01320
 1D/BODY. DEG PITCH ANGLE. FIXED/BODY. DEG ROLL ANGL DAT01330
 ?E. FIXED/BODY. DEG COLLECTIVE STICK POSITION. PCT /
 3 CYCLIC STICK POSITION. PCT /
 DATA PLOT1 /
 4. RIGHT WING ANGLE OF ATTACK. DEG LEFT WING ANGLE OF ATTACK. DEG
 SEG FIN ANGLE OF ATTACK. DEG ELEVATOR ANGLE OF ATTACK. DDAT01370
 6°ATH. DEG C.G. STATION LINE LOCATION. IN. /
 DATA PLOTJ /
 7.* BODY AXES. FT/SEC X-COMP G-S. BODY AXES X-COMP GUST VEL DAT01400
 8CYCLIC STICK POSITION. PCT LEFT WING COEFFICIENT OF LIFT QIGDAT01410
 9WT WING COEFFICIENT OF LIFT ELEVATOR COEFFICIENT OF LIFT JAT01430
 A ,/
 DATA PLOTM /
 A . FIN COEFFICIENT OF LIFT BODY PITCH WRT. FLIGHT PATH DAT01450
 B. DEG C.G. BUTT LINE LOCATION. IN. Y-COMP GUST VEL.. BDDAT01470
 CY AXES. FT/SEC Y-COMP G-S. BODY AXES ,/
 DATA PLOTL /
 1CIENT OF DRAG PEDAL POSITION. PCT LEFT WING COEFF DAT01490
 ?COEFFICIENT OF DRAG RIGHT WING COEFFICIENT OF DRAG ELEVATOR DAT01500
 3. WATER LINE LOCATION. IN. FIN COEFFICIENT OF DRAG C-GAT01510
 4EC /
 DATA PLOTW /
 4. RIGHT/CENTER JET THRUST. LB 1-Z-COMP G-S. BODY AXES
 5LB TOTAL HORSEPOWER REQUIRED ENGINE TORQUE SUPPLIED. FT-DAT01550
 6 SHAFT HORSEPOWER ROTOR BRAKE TDRDAT01570
 7QFE APPLIED. FT-LB ,/
 DATA PLOT19 / 1BLADE1. ROTOR1. DEG AZIMUTH LOC.. DATA01590
 1BLADE2. ROTOR1. DEG AZIMUTH LOC.. BLADE3. ROTOR1. DEG AZIMUTH DATA01600
 ?LJC.. BLADE4. ROTOR1. DEG AZIMUTH LOC.. BLADE5. ROTOR1. DEG AZDAT01610
 3IMUTH LOC.. BLADE6. ROTOR1. DEG AZIMUTH LOC.. BLADE7. ROTOR1. DEDAT01620

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4G  /*
DATA PLOT20 / * BETA-2DOT. BLADE1. ROTOR1. DEG/SEC SEC BETA-2DOT. BLADDA DAT01630
1F2. ROTOR1. DEG/SEC SEC BETA-2DOT. BLADE3. ROTOR1. DEG/SEC SEC BETA-2DOT. BLADDA DAT01640
2T. BLADE4. ROTOR1. DEG/SEC SEC BETA-2DOT. BLADE5. ROTOR1. DEG/SEC SEC BETA-2DOT. BLADDA DAT01650
3TA-2DOT. BLADE6. ROTOR1. DEG/SEC SEC BETA-2DOT. BLADE7. ROTOR1. DEG/SEC SEC DAT01660
4SEC */ DATA PLOT21 / * BETA-DOT. BLADE1. ROTOR1. DEG/SEC SEC BETA-DOT. BLADDA DAT01670
1E2. ROTOR1. DEG/SEC SEC BETA-DOT. BLADE3. ROTOR1. DEG/SEC SEC BETA-DOT. BLADDA DAT01680
2. BLADE4. ROTOR1. DEG/SEC SEC BETA-DOT. BLADE5. ROTOR1. DEG/SEC SEC BETA-DOT. BLADDA DAT01690
3TA-DOT. BLADE6. ROTOR1. DEG/SEC SEC BETA-DOT. BLADE7. ROTOR1. DEG/SEC SEC DAT01700
4C /* DATA PLOT22 / * BETA. BLADE1. ROTOR1. DEG
1ROTOR1. DEG BETA. BLADE3. ROTOR1. DEG
2A0E4. ROTOR1. DEG BETA. BLADE5. ROTOR1. DEG
3TA. BLADE6. ROTOR1. DEG BETA. BLADE7. ROTOR1. DEG
4C /* DATA PLOT23 / * AZIMUTH LOC. BLADE1. ROTOR2. DEG
1BLADE2. ROTOR2. DEG AZIMUTH LOC. BLADE3. ROTOR2. DEG AZIMUTH DAT01750
2LOC. BLADE4. ROTOR2. DEG AZIMUTH LOC. BLADE5. ROTOR2. DEG AZIMUTH DAT01810
3IMUTH LOC. BLADE6. ROTOR2. DEG AZIMUTH LOC. BLADE7. ROTOR2. DEG AZIMUTH DAT01770
4G /* DATA PLOT24 / * BETA-2DOT. BLADE1. ROTOR2. DEG/SEC SEC BETA-2DOT. BLADDA DAT01780
1F2. ROTOR2. DEG/SEC SEC BETA-2DOT. BLADE3. ROTOR2. DEG/SEC SEC BETA-2DOT. BLADDA DAT01790
2T. BLADE4. ROTOR2. DEG/SEC SEC BETA-2DOT. BLADE5. ROTOR2. DEG/SEC SEC BETA-2DOT. BLADDA DAT01840
3TA-2DOT. BLADE6. ROTOR2. DEG/SEC SEC BETA-2DOT. BLADE7. ROTOR2. DEG/SEC SEC BETA-2DOT. BLADDA DAT01850
4SEC */ DATA PLOT25 / * BETA-DOT. BLADE1. ROTOR2. DEG/SEC SEC BETA-DOT. BLADDA DAT01860
1E2. ROTOR2. DEG/SEC SEC BETA-DOT. BLADE3. ROTOR2. DEG/SEC SEC BETA-DOT. BLADDA DAT01870
2. BLADE4. ROTOR2. DEG/SEC SEC BETA-DOT. BLADE5. ROTOR2. DEG/SEC SEC BETA-DOT. BLADDA DAT01880
3TA-DOT. BLADE6. ROTOR2. DEG/SEC SEC BETA-DOT. BLADE7. ROTOR2. DEG/SEC SEC DAT01890
4C /* DATA PLOT26 / * BETA. BLADE1. ROTOR2. DEG
1ROTOR2. DEG BETA. BLADE3. ROTOR2. DEG
2A0E4. ROTOR2. DEG BETA. BLADE5. ROTOR2. DEG
3TA. BLADE6. ROTOR2. DEG BETA. BLADE7. ROTOR2. DEG
4C /* DATA PLOTN /
7N C.G. LA X-FORCE FROM RIGHT WING. LB
8ROM LEFT WING. LB X-FORCE FROM ELEVATOR. LB
9RCE FROM FUSELAGE. LB X-FORCE FROM RIGHT JET. LB
A /* DATA PLOTO /
A X-FORCE FROM LEFT/CENTER JET. LB X-FORCE FROM ROTOR1. LB
B X-FORCE FROM ROTOR2. LB X-FORCE FROM WEAPON FDAT02050
CIRE. LB X-FORCE FROM FIN. LB /
DATA PLOTP /
IN C.G. LB X-FORCE FROM WEIGHT. LB TOTAL Y-FORCE DAT02070
2ROM RIGHT JET. LB Y-FORCE FROM FUSELAGE. LB Y-FORCE FDAT02090
3ORCE FROM ROTOR1. LB /
DATA PLOTO /
4 Y-FORCE FROM WEAPON FIRE. LB Y-FORCE FROM FIN. LB DAT02110
5 Y-FORCE FROM WEIGHT. LB TOTAL Z-FORCE ON C.G. DAT02130
6. LB Z-FO. E FROM RIGHT WING. LB /
DATA PLOTR /

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7FT WING, LB Z-FORCE FROM ELEVATOR, LB Z-FORCE FDAT02170
 FROM FUSELAGE, LB Z-FORCE FROM RIGHT JET, LB Z-FORCE FROM ROTOR1, LB Z-FORCE FDAT02180
 9FORCE FROM LEFT/CENTER JET, LB Z-FORCE FROM ROTOR1, LB DAT02190
 A / DAT02200
 DATA PLOTS / DAT02210
 A * Z-FORCE FROM ROTOR2, LB Z-FORCE FROM WEAPON FIRE, LDAT02220
 BB Z-FORCE FROM WEIGHT, LB TOTAL ROLL MOM ON C.G.DAT02230
 C.. FT-LB ROLL MOM FROM RIGHT WING, LB * / DAT02240
 DATA PLOTT/ * ROLL MOM FROM LEFT WING, FT-LB ROLL MOM FROM EDAT02250
 1ELEVATOR, FT-LB ROLL MOM FROM FUSELAGE, FT-LB ROLL MOM DAT02260
 2FROM RIGHT JET, FT-LB ROLL MOM FROM LEFT/CENTR JET, FT-LB ROLL DAT02270
 3L MOM FROM ROTOR1 FORCES, FT-LB * / DAT02280
 DATA PLOTU / * ROLL MOM FROM ROTOR2 FORCES, FT-LDAT02290
 4A ROLL MOM FROM WEAPON FIRE, FT-LB ROLL MOM FROM FIN, FT-LB DAT02300
 5 ROLL MOM FROM ROTOR1 TORQUE, FT-LB ROLL MOM FROM ROTOR2 DAT02310
 6TORQUE, FT-LB TOTAL PITCH MOM ON C.G., FT-LB * / DAT02320
 DATA PLOTV / * PITCH MOM FROM DAT02330
 7RIGHT WING, FT-LB PITCH MOM FROM LEFT WING, FT-LB PITCH MOM DAT02340
 8 FROM ELEVATOR, FT-LB PITCH MOM FROM FUSELAGE, FT-LB PITUDAT02350
 9CH MOM FROM RIGHT JET, FT-LB PITCH MOM FROM LEFT/CENT JET, FT-DAT02360
 ALB' / DAT02370
 DATA PLOTN / DAT02380
 A * PITCH MOM FROM ROTOR1 FORCES, FT-LB PITCH MOM FROM ROTOR2 FORCEDATO2390
 BS, FT-LB PITCH MOM FROM WEAPON FIRE, FT-LB PITCH MOM FROM FIN, FDAT02400
 CT-LB PITCH MOM FROM ROTOR1 TORQUE, FT-LB' / DAT02410
 DATA PLOTX / * PITCH MOM FROM ROTOR2 TORQUE, FT-LB TOTAL YAN MOM ODAT02420
 IN C.G.. FT-LB YAN MOM FROM RIGHT WING, FT-LB YAN MOM FDAT02430
 2ROM LEFT WING, FT-LB YAN MOM FROM ELEVATOR, FT-LB YANDAT02440
 3 MOM FROM FUSELAGE, FT-LB * / DAT02450
 DATA PLOTY / * YAN MOM FROM RIGHT JET, FT-LB DAT02460
 4 YAN MOM FROM LEFT/CENT JET, FT-LB YAN MOM FROM ROTOR1 FORCES, DAT02470
 5 FT-LB YAN MOM FROM ROTOR2 FORCES, FT-LB YAN MOM FROM WEAPON FDAT02480
 6IRE, FT-LB YAN MOM FROM FIN, FT-LB * / DAT02490
 DATA PLOTZ / * YAN MOM FROM ROTAT02500
 7TORI TORQUE, FT-LB YAN MOM FROM ROTOR2 TORQUE, FT-LB ROTOR1 F/DAT02510
 8A FLAPPING MOMENT, FT-LB ROTOR1 LAT FLAPPING MOMENT, FT-LB ROTDAT02520
 9JR2 F/A FLAPPING MOMENT, FT-LB ROTOR2 LAT FLAPPING MOMENT, FT-LB DAT02540
 A / DAT02550
 DATA PLOTO / DAT02560
 A * NOT USED END
 DAT02570

4	-4..-3..-2..-1..0..1..2..3..4..5..6..7..8..	2*.01.
5	9..10..11..12..13..14..15..16..21..30..50..	0..0..
6	60..70..80..90..100..110..120..140..160..165..	0..0..
7	170..175..180..	0..0..
8	4*.022.	0..0..
9	6*.01.	0..0..
10	4*.077.	0..0..
11	0..060.	0..055.
12	4*.132.	0..056.
13	0..13.	2*.056.
14	4*.217.	0..12.
15	0..236.	2*.126.
16	4*.3n?	0..226.
17	H..3.	2*.232.
18	H..29.	2*.296.
19	J..4*.977.	2*.036.
20	J..1..04.	1..03..
21	DATA CX42/	4*1..652.
22	1..1..65.	1..64.
23	1..2..847.	2*1..846.
24	1..1..85.	1..84.
25	4*2..002.	2*1..036.
26	5..2.	1..99.
27	4*2..022.	2*1..996.
28	6..7..2..02.	2..01.
29	4*1..962.	2*2..016.
30	9..1..96.	1..95.
31	4*1..812.	2*1..956.
32	A..1..845.	1..835.
33	C..4..1..662.	1..845.
34	D..1..65.	1..64.
35	E..4*1..296.	2*1..646.
36	F..1..39.	1..38.
37	G..4*0..562.	2*1..386.
38	H..57.	0..56.
39	I..4*0..332.	2*..566.
40	J..-33.	32..209..213..216.
41	DATA CX43/	0..202..
42	1..-27.	0..259.
43	2..-166.	0..177.
44	3..-258.	0..246.
45	4..-130.	0..145.
46	5..-746.	0..233.
47	6..-172.	0..0855.
48	7..-234.	0..221.
49	8..-C27.	0..032.
50	9..-222.	0..208.
51	A..-018.	0..0212.
52	B..-21.	0..196.
53	C..-015.	0..0163.
54	D..-198.	0..183.
55	E..-n1338.	0..n1413.
56	F..-186.	0..171.
57	G..-n1175.	0..n1213.
58	H..-174.	0..161.

I	.01113.	.01126.	.01132.	.01138.	.02525.	.0595.
J	.162	.146	.149	.173.	.18	.206
DATA CX44/	4*.0105.				.01875.	.0395.
1	.151	.133	.136	.161	.169	.196
2	4*.01025.				.01475.	.0252.
3	.13	.108	.123	.143	.157	.187
4	4*.01				.012	.0175.
5	.109	.079	.09	.124	.146	.177
6	4*.01				.0102	.013
7	.081	.0495	.05625.	.08	.135	.1675
8	4*.01				.009	.0105.
9	.053	.022	.025	.04	.123	.158
A	4*.01				.00825.	.009.
B	.031	.011	.01425.	.024	.055	.148
C	4*.01				.008	.00825.
D	.01	.00825	.01325.	.02325.	.0435	.1375
E	2*	.009			2*	.008.
F			.02175.	2*	.046.	.107
G	4*.01				2*	.008.
H	.0085	.009	.062	.085	.086	.1
I	4*.01				2*	.008.
J	.01	.012	.0955	2*	.117.	.11
DATA CX45/	4*.01.				.008	.
1	.016	.028	.1235	2*	.146.	.0082
2	4*.01025.				.00825.	.
3	.031	.05	.139	2*	.162.	.009
4	4*.0105				.009	.
5	.055	.088	.153	2*	.177.	.144
6	.01113	.01126.	.01132.	2*	.177.	.127
7	.085	.11	.168	.01138.	.01025.	.01325.
8	.01175	.01200.	.01213.	.191	.193	.179
9	.111	.128	.183	.01225.	.012	.0174.
A	.01338	.01413.	.0145	.205	.208	.195
B	.131	.149	.198	.01488.	.01475.	.025
C	.015	.0163	.0169	.0175	.0185	.039
D	.15	.162	.212	.234	.239	.231
E	.018	.0212	.023	.0245	.025	.0595
F	.169	.178	.227	.249	.255	.248
G	.027	.032	.0345	.037	.036	.0885
H	.191	.2	.2415	.263	.27	.264
I	.072	.0855	.0938	.101	.0705	.131
J	.213	.22	.257	.277	.286	.282
DATA CX46/						/
1	.232	.238	.271	.291	.301	.299
2	.166	.177	.1825	.188	.162	.201
3	.251	.258	.286	.306	2*	.3165.
4	.202	.209	.213.	.216.	.209	.237
5	.272	.282	.301	.32	2*	.332.
6	4*.332				.29	.
7	.33	.32		2*	.324.	.295
8	4*.562				2*	.56.
9	.57	.56		2*	.566.	.52
A	4*1.296.				1.34	1.345.
B	1.39				1.38	2*1.386.

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C 4*1.662,          1.604 *
D 1.65,             1.64   *
E 4*1.812,          2*1.646 *
F 1.845,             .     *
G 4*1.962,          1.95   *
H 1.96,             2*1.841 *
I 4*2.022,          2*1.956 *
J 2.02,             2.01   *
DATA CX47/ 4*2.002,          / *
1 2,                 1.99   *
2 4*1.847,          2*1.996 *
3 1.85,             1.84   *
4 4*1.652,          2*1.846 *
5 1.65,             1.64   *
6 4*1.646,          2*1.646 *
7 1.04,             1.03   *
8 4*1.302,          2*1.036 *
9 1.30,              .29   *
A 4*1.217,          2*1.296 *
B .236,              .226   *
C 4*1.132,          2*1.232 *
D 1.13,              .12   *
E 4*1.077,          2*1.126 *
F .06,               .055   *
G 4*1.022,          2*1.056 *
H 6*.01/             2*.055 *
I 2*.01 *             .     *
DAT11630
DAT11640
DAT11650
DAT11660
DAT11670
DAT11680
DAT11690
DAT11700
DAT11710
DAT11720
DAT11730
DAT11740
DAT11750
DAT11760
DAT11770
DAT11780
DAT11790
DAT11800
DAT11810
DAT11820
DAT11830
DAT11840
DAT11850
DAT11860
DAT11870
DAT11880
DAT11890
DAT11900
DAT11910

```

```

SUBROUTINE DET
COMMON /STB0/ UX,UY,UQ,VQ,T,A(9,2),N,NS
DOUBLE PRECISION C,UQ,VQ,UX,VQ,UX,VQ,VO,XR,YO,XO
N1=N-1
K=J
ID=1.
DO 57 L=1,N1
J=K+L
JN=J+N
J1=J+1
K=K+N
IF(UV.NE.0.) GO TO 1
IF(A(J,1))43,42,43
42 DO 44 I=J1,K
IF(A(I,1))45,44,45
44 CONTINUE
GO TO 113
45 J0=-U0
IM=I-J
DO 46 I=J,NS,N
IM=M=I+IM
B=A(I,1)
A(I,1)=A(IMM,1)
46 A(IMM,1)=B
UD=U0*A(I,1)
X0=-1./A(I,1)
DO 47 I=J1,K
IF(A(I,1).NE.0.) A(I,1) = A(I,1)*XD
CONTINUE
DO 80 M=JN,NS,N
IF(A(M,1))60,RQ,60
MJ=M-J
DO 41 I=J1,K
IF(A(I,1))49,41,49
49 IC=MJ+
A(IC,1)= A(IC,1)+A(I,1)*A(M,1)
41 CONTINUE
81 CONTINUE
GO TO 57
1 IF(A(J,1).NE.0.OR. A(J,2).NE.0.) GO TO 16
1 DO 7 I=J1,K
IF(A(I,1).NE.0.OR. A(I,2).NE.0.) GO TO 15
7 CONTINUE
GO TO 113
15 UD=-UD
VD=-VO
IM=I-J
DO 19 I=J,NS,N
IM=M=I+IM
ON 19 M=1,2
B=A(I,M)
A(I,M)=A(IMM,M)
19 A(IMM,M)=B
DET00010
DET00020
DET00030
DET00040
DET00050
DET00060
DET00070
DET00080
DET00090
DET00100
DET00110
DET00120
DET00130
DET00140
DET00150
DET00160
DET00170
DET00180
DET00190
DET00200
DET00210
DET00220
DET00230
DET00240
DET00250
DET00260
DET00270
DET00280
DET00290
DET00300
DET00310
DET00320
DET00330
DET00340
DET00350
DET00360
DET00370
DET00380
DET00390
DET00400
DET00410
DET00420
DET00430
DET00440
DET00450
DET00460
DET00470
DET00480
DET00490
DET00500
DET00510
DET00520
DET00530
DET00540

```

```

16   C=UD*A(J,1)-VD*A(J,2)
    VD=UD*A(J,2)+VD*A(J,1)
    UD=C
    IF(A(J,1)>21.22.21
22    XD=0,
     YD=1./A(J,2)
     GD TO 23
21    XR=A(J,2)/ A(J,1)
    XM=(1.0+XR*XR)*A(J,1)
    XD=-1./XM
    YD=XR/XM
    DO 25 I=J1,K
23    B=XD*A(I,1)-YD* A(I,2)
    A(I,2)= XD*A(I,2)+YD*A(I,1)
    2   AI,I,1)= B
    5  CONTINUE
    ND 81 M=JM,NS,N
    IF( A(M,1).EQ.0..AND.A(M,2) .EQ. 0. ) GD TO 81
    M,J=M-J
    DO 27 I=J1,K
27    IF( A(I,1).EQ.0..AND. A(I,2) .EQ. 0. ) GD TO 27
    IC=MJ+1
    AI,C,1)=AI(C,1)+A(I,1)*A(M,1)-A(I,2)*A(M,2)
    AI(C,2)=AI(C,2)+A(I,1)*A(M,2)+A(I,2)*A(M,1)
    27  CONTINUE
    81  CONTINUE
    57  CONTINUE
    IF(UY)56.55.56
    117  UD=0,
    55  JO=UD*A(NS,1)
    14  VC=C.
    RETURN
    56  UD=UD*A(NS,1)-VD*A(NS,2)
    VD=UD*A(NS,2)+VD*A(NS,1)
    QFTURN
    END

```

DET00550
DET00560
DET00570
DET00580
DET00590
DET00600
DET00610
DET00620
DET00630
DET00640
DET00650
DET00660
DET00670
DET00680
DET00690
DET00700
DET00710
DET00720
DET00730
DET00740
DET00750
DET00760
DET00770
DET00780
DET00790
DET00800
DET00810
DET00820
DET00830
DET00840
DET00850
DET00860
DET00870
DET00880
DET00890
DET00900


```
      SUBROUTINE DOGS (RX,RY,RZ,FX,FY,FZ,ROLL,PITCH,YAW)
      COMPUTE VECTOR CROSS PRODUCT L = R X F
      ROLL = RY*FZ - RZ*FY
      PITCH = RZ*FX - RX*FZ
      YAW = RX*FY - RY*FX
      ...
      RETURN
      END
```

```

SUBROUTINE DOROT (N)
COMMON /ANDDIT/
  1 A1,B1,XK,XY,V12,V14,APDM,APFM,ARDM,ARFM,
   AYFM,ROTJ,XK43,XLIM,CBFAC,
   GDISK(12),NPSI,TANAI,TANBI,
   TANT1,TANT2,DCAFXK,IPRINT,MORAOL,
   SHEARL(12),SHEARD(12),SHEARR(12),
   XMOML(12),XMOMD(12),
   2 *APDS,ARDS,PFAC,RFAC,APDBS,AROBS
   3 22,VXS(2),VYS(2),VZS(2),BETA(12,2),
   4 T,PCC(2),CDSE(17,2),BETAN(2),BETAX(2),BETAZ(2),
   5 ABD(2),APDD,ARDD,AYDD,AIR(2),
   6 OPS(12,2),DTRR,NPSI(2),Z2TR,
   7 BETAN(12,2),BNPSI(2),
   8 COND2,CMAXV,RATE1,RATE2,STOP2,
   9 THROT(2),TRIND,XGUST,BETAZD(2),CMAXV,
  10 GMAXV2,CMAXV3,GUSTYP,HNPSSR(2),
  11 HUBKPS,HUBKRS,HUBTPS,HUBTRS,
  12 KONFIG,LNGTMI,PILGH1,PSIREF(2),
  13 START2,XMOML(12,2),
  14 R(2),OR(2),T(2),
  15 T2(2),TZ(2),XMA(2),
  16 XMB(2),AIBP(2),AIBR(2),
  17 APDR(2),ARDR(2),PSID(2),
  18 XSTAH(2),YSTAH(2),
  19 HUBKPR(2),HUBKRR(2),
  20 *AZETAR(2),ZETAR(2),
  21 1,V,INO,NWAG,APMT,AYBMT,BETAD(2),TOELT,
  22 SEFAE(2),HGSTE,HGUSTF,HGUSTW,HGUSTE,
  23 VGUSTW,YGUSTF,GFMD,GLAT,GVERT,
  24 VXB,VZB,APD,VYB,ARD,AYD,
  25 COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
  26 APE,ARE,AIM,BIM,AITR,BITR,
  27 XARI(2),YARI(2),ZARI(2),
  28 VIR(2),ZETAR(2),MFORCE(2),
  29 THRUST(2),TORQUE(2),YFORCE(2),
  30 J,W,ITA,VMS(2),LINK,QELE,VROT(2),
  31 VSNO,YFIN(2),ZFEL(2),AIBAL(2),
  32 BIBAL(2),COND1,SWING,PILGH2,PHGELL,
  33 B(2),PMOM(2),RMOM(2),
  34 AM(2),CT,P1,XB(2),ALT,ADR(2),EXH(2),
  35 NXR(2),RBH(2),SWC(2),UHS,CDMB(2),LROT(2),
  36 RAIB(2),RTRP(2),TAIR(14),CDNEK(2),OCAFR(2),FVIND,
  37 NVARD,
  38 SWKR(2),SMKR(2),TIP1B(2),TIP3B(2),
  39 TWIST(20,2),CLRADK(2),DELTAS(2),
  40 LAMBDA(2),UPGUST,URGUST,UTGUST,WMOTOR,
  41 ER(2),ERX(2),
  42 XLIMAX(2),XLIMIN(2),
  43 AH(3),AL(3),EXIT,ICOM(49),IPSN,
  44 NPART,NVARA,NVARB,NVARC,NSCALE
  45 *NVARS,NPRINT,NTIME
  46 DATA TDPI,D49,D105,D255,D315 /6.2031053./70539016.1.0325957,
  47 COMMON /TOPLOT/
  48 COMMON /LOISK/LOCATE(120)
  49 DATA TDPI,D49,D105,D255,D315 /6.2031053./70539016.1.0325957,

```

```

1      DIMENSION HUBKS(2,2),JFLAP(7)
      EQUIVALENCE (HUBKS(1,1),HUBKPS)
      REAL LAM,MRCP,MRSP,MRCPCB,LNGTH1,LAMBDA
      REAL NOPSI2
      LOGICAL NRIGID
      NRIGID=.TRUE.
      IF(BETAX(N).EQ.BETAN(N)) NRIGID=.FALSE.
      IJ = 1
      ADXMOM = 0.0
      PSIOSQ = PSIO(N)**2
      NOPS12=2./NOPS1
      IF(LINK.LT.4) GO TO 9
      DO 10 L=1,NOPS1
      JFLAP(L)=0
      IF(NRIGID) GO TO 5
      BETAL(N)=BETAZ(N)
      BETAD(L,N)=BETAZD(N)
      GO TO 10
      5 CONTINUE
      IF(BETAL(N).LT.BETAN(N)) GO TO 2
      IF(BETAL(N).LT.BETAX(N)) GO TO 10
      JFLAP(L)=1
      DBETA=BETAX(N)-BETAL(N)
      DBETAD=0.
      IF(BETAD(L,N).GT.0.) DBETAD=-BFTAD(L,N)
      GO TO 3
      ? CONTINUE
      JFLAP(L)=-1
      DBETA=BETAN(N)-BETAL(N)
      DBETAD=0.
      IF(BFTAD(L,N).LT.0.) DBETAD=-BETAD(L,N)
      3 CONTINUE
      DO 4 K=1,NOPS1
      BETAK(N)=COS(EIK,L,N)*DBETA+BETA(K,N)
      BETAD(K,N)=COS(EIK,L,N)*DBETAD+BFTAD(K,N)
      4 CONTINUE
      10 CONTINUE
      9 CONTINUE
      DO 40 L=1,NOPS1
      PSIR=PSIREF(N)+DPSI(L,N)
      IF(PSIR.GE.TWOP1) PSIR=PSIR-TWOP1
      VXOR=VIR(N)
      IF((PSIR.GT.D45.AND.PSIR.LT.D105).OR.
      1 (PSIR.GT.D255.AND.PSIR.LT.D315))
      2 VXOR=VXOR+XY*SIN(6.*((PSIR-D45)))
      SPSI=SIN(PSIR)
      CPSI=COS(PSIR)
      IF(LINK.EQ.4) GO TO 27
      IF(NRIGID) GO TO 26
      BETAL(N)=BETAZ(N)
      BFTAD(L,N)=BETAZD(N)
      GO TO 27
      26 CONTINUE

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```

BFTA(L,N)=BETAZ(N)-ATAN(TANAL*CPSI*TANBL*CPSII)
BETAD(L,N)=-(COS(BETAZ(N))-BETA(L,N))**2*(PFAC*CPSI+RFAC*CPSII)
?7 CONTINUE
SBFAC=SPSI*COS(APFM)*SIN(APFM)+CPSI*SIN(APFM)
SBETA=SIN(BETA(L,N))+BETAE(N)
CBETA=COS(BETA(L,N))+BETAE(N)
CBDR=OR(N)*CBETA
9DDTR=R(N)*(BETAD(L,N)-ARDS*SPSI-APDS*CPSII)
BETA=BETA(L,N)-BETAZ(N)
TZPD=TZR(N)-ATAN(TAMT1*SPSI+TANT2*CPSII)-BETA*DELTA3(N)
SHEARL(L)=0.
SHEARD(L)=0.
SHEARR(L)=0.
XMDML(L)=0.
XMDMD(L)=0.
XKLAW= 1.333333*XK43*CPSI
MRCPCP=VXS(N)*CPSI-VYS(N)*SPSI
MRCPSB=MRCP*SBEA
MRCPCG=MRCP*CBEA
STORE=1.
JLOC=(PSIR+D45)*52359878
IF(JLOC.LT.12) JLOC=1
JLOC=10*JLOC-9
IF(IPRINT.EQ.0) GO TO 55
PSI=PSIR*DTRP
IF(IJ.EQ.21) GD T3 53
IJ = 2
WRITE (6,50)
50 FORMAT(1H,1)
GO TO 52
53 WRITE (6,51)
51 FORMAT (1H ,//)
IJ = 1
52 WRITE (6,424) PSI*VXS(N)*VYS(N)*VZS(N)*XK*SBETA*CBEA*DCTR
IF(CLRADK(N).LT.0.) GD TD 55
IJ=1
54 WRITE (6,425)
55 XR=1.+XB(N)
DO 70 K=1,NDRADL
XR=XR-XB(N)
IF(XR.LT.-.7) VXOR=VIR(N)
LAM=LAMDA(N)+VXOR*(1.-XKLAW*XR)
RR=XR*RIN)
IF(GUSTYP.LT.1.) GO TO 13
AGUSTR=0.
HGUSTR=0.
YGUSTR=0.
XR=RR*CPSI
YR=RR*SPSI*ROTJ
CALL RATS (XRR,YR,O.*AYFM,APFM,STA,8L,TV,1)
XSTARE=SORT((XSTAH(N)+STA)**2+(YSTAH(N)+BL)**2)-XGUST
IFI(XSTARE.LE.0.) GO TO 600
DORO1090
DORO1120
DORO1110
DORO1120
DORO1130
DORO1140
DORO1150
DORO1160
DORO1170
DORO1180
DORO1190
DORO1200
DORO1210
DORO1220
DORO1230
DORO1240
DORO1250
DORO1260
DORO1270
DORO1280
DORO1290
DORO1300
DORO1310
DORO1320
DORO1330
DORO1340
DORO1350
DORO1360
DORO1370
DORO1380
DORO1390
DORO1400
DORO1410
DORO1420
DORO1430
DORO1440
DORO1450
DORO1460
DORO1470
DORO1480
DORO1490
DORO1500
DORO1510
DORO1520
DORO1530
DORO1540
DORO1550
DORO1560
DORO1570
DORO1580
DORO1590
DORO1600
DORO1610
DORO1620

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1 IF(GUSTYP.EQ.1.U.0.OR.GUSTYP.EQ.12.) GO TO 11
1 IF(XSTARE.LE.START2) GO TO 601
1 IF(XSTARE.GE.STOP2) GO TO 602
AGUSTR=GMAXV3*XSTARE*RATE2
GO TO 605
601 IF(XSTARE.LE.LNGTH1) GO TO 604
AGUSTR=XSTARE*RATE1
GO TO 605
604 AGUSTR=GMAXV1
GO TO 605
605 / AGUSTR=GMAXV
605 IF(GUSTYP.EQ.11.) GO TO 606
11 IF(XSTARE.LE.START2) GO TO 608
1 IF(XSTARE.GE.STOP2) GO TO 600
AGUSTR=GMAXV2*(SIN(XSTARE-START2)*PILGH2))**2
GO TO 612
608 IF(XSTARE.GE.LNGTH1) GO TO 600
AGUSTR=GMAXV1*(SIN(XSTARE*PILGH1))**2
612 IF(GUSTYP.EQ.12.) GO TO 606
6C7 CONTINUE
CALL RATS (0..0..AGUSTR,AYFM,APFM,ARFM,HGUSR,YGUSR,VGUSR,-1)
GO TO 609
606 CONTINUE
CALL RATS (AGUSTR,0..0..AYFM,APFM,ARFM,HGUSR,YGUSR,VGUSR,-1)
609 YGUSR=YGUSR*ROTJ
600 IF(ISTONE.LE.0.) GO TO 16
GOISK(LOCATE(JLLOC),,AGUSTR
JLOC=JLOC+1
170 16 STORE--STORE
UGUST=HGUST*CPSI-YGUSR*SPSI
UGUST=HGUST*SBETA-YGUSR*CBETA
UGUST=HGUST*SPSI+YGUSR*CPSI
UGUST=UGUST*CBETA+VGUSR*SBETA
13 CONTINUE
UP=LAM*CBETA-XR*BODTR-MRCPSB+UPGUST
UT=XR*CBOR+HRSP-UTGUST
UR=URGUST-LAMESBETA-MRCPCB
T2TW=T2PD-TWIST(K,N)
UIPSQ=UR**2+UT**2
UIP=SQRT(UIPSQ)
U=SQRT(UP**2+UIPSQ)
GAMMA=ABS(LAN(LUT/UR))
SGAM=STN(GAMMA)**2
CGAM=1.-SGAM
IF(CLRAOK(N).GE.0.) GO TO 17
SGAM=1.
SGAM=C.
U=SORT(UP**2+UT**2)
17 CONTINUE
CGAMCT=CCGAM*U*ABS(COS(T2TW))
UPT=UP*SGAM
UPR=UP*CGAM
PHI=Q.

```

```

IF(UT.NE.0..OR.UPT.NE.0.) PHI=ATAN2(UPT,UT)
USGM=USGM
XMACN=USGM*VSND
XMACR=USGM*VSND
PHIR=0.
JELUR=NE.0..OR.UPR.NE.0.) PHIR=ATAN2(UPR,UR)
IF(UR.GT.EXIT(N)) GO TO 14
ALF=0.
CL=0.
CD=CHB(N)
CLR=0.
CDR=CD
GO TO 15
14 CONTINUE
ALF=T2TW*PHI
CALL CLCD (ALF,CL,CD,XMACN,EXIT,N)
IF(EXIT.NE.0.) RETURN
IF(CLRADK(N).GE.0.) CALL CLCD (PHIR,CLR,CDR,XMACR,EXIT,N)
IF(EXIT.NE.0.) RETURN
CLR=CLC*CLRADK(N)
15 CONTINUE
ALDAD=USGM*(CLC*UT+CD*UPT)+CGAMCT*(CLR*UR+CDR*UPR)
ALDAD=USGM*(CD*UT-CL*UPT)
ALADR=CGAMCT*(CDR*UR-CLR*UPR)
ALDR=ALLOAD*RR
ALDR=ALDAD*RR
IFIK,NE,2) GO TO 2C
SHEAR(L)=TIP3B(N)*SHEAR(L)+TIP18(N)*ALLOAD
SHEARD(L)=.375*SHEARD(L)+.125*ALDAD
SHEAR(L)=.375*SHEAR(L)+.125*ALDADR
XMONL(L)=TIP3B(N)*XMONL(L)+TIP18(N)*ALDLR
XMODL(L)=.375*XMODL(L)+.125*ALDDR
20 SHEAR(L)=SHEAR(L)+ALLOAD
SHEARD(L)=SHEARD(L)+ALDAD
SHEAR(L)=SHEAR(L)+ALDADR
XMONL(L)=XMONL(L)+ALDLR
XMODL(L)=XMODL(L)+ALDDR
IF(IPRINT.EQ.0) GO TO 30
PHI=PHI*DTRR
ALF=ALF*DTRR
WRITE(6,407) XR,PHI,ALF,CL,CD,XMACN,VXOR,LAM,UT,UP
IF(CLRADK(N).LT.0.) GO TO 30
GAMMA=GAMMA*DTRR
PHIR=PHIR*DTRR
WRITE(6,408) GAMMA,PHIR,CLR,CDR,XMACR,UR,UPR,UP
30 CONTINUE
XMONL(L)=XMONL(L)+HMPSIR(N)
BMON=(HUBKPN(N)*CPS1**2+HUBKRN(N)*SPSI**2)*BETA1*NOPS12
DORO2170
DORO2180
DORO2190
DORO2200
DORO2210
DORO2220
DORO2230
DORO2240
DORO2250
DORO2260
DORO2270
DORO2280
DORO2290
DORO2300
DORO2310
DORO2320
DORO2330
DORO2340
DORO2350
DORO2360
DORO2370
DORO2380
DORO2390
DORO2400
DORO2410
DORO2420
DORO2430
DORO2440
DORO2450
DORO2460
DORO2470
DORO2480
DORO2490
DORO2500
DORO2510
DORO2520
DORO2530
DORO2540
DORO2550
DORO2560
DORO2570
DORO2580
DORO2590
DORO2600
DORO2610
DORO2620
DORO2630
DORO2640
DORO2650
DORO2660
DORO2670
DORO2680
DORO2690
DORO2700

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```

XMONL1(L,N)=XMOM+RAIB(N)+XMOM1+AIB(N)
XMA(N)=XMA(N)+XMOM2*SPSI
XMB(N)=XMB(N)+XMOM2*CPSTI
TORQUE(N)=TORQUE(N)+XMOND(L)
THRUST(N)=THRUST(N)+SHEAR(L)*CRETA-SHEARR(L)*S8ETA
SHLSRC*SHEAR(L)*S8ETA+C8ETA
YFORCE(N)=YFORCE(N)-SHEARD(L)*CPSI-SHLSRC*SPSI
MFORCE(N)=MFORCE(N)-SHEARD(L)*SPSI-SHLSRC*CPSTI
ADXMOM=ADXMOM+XMOM(L)
IF IN RIGID GO TO 40
XMOMBH=XMONL1(L,N)*RBH(N)
PMOM(N)=PMOM(N)+XMOMBH*CPSTI
RMOM(N)=RMOM(N)+XMOMRH*SPSI
XMONL1(L,N)=0.

40 CONTINUE
    DSQI=PSIDSQ*AIB(N)
    ADXMOM=ADXMOM/NOPS1
    DO 41 K=1,3
        C80=COS(BETA0(N))
        S80=SIN(BETA0(N))
        F80H=C80+HUBKS(1,N)
        FBE=CONEK(N)*BETAF(N)-AOXMOM*C80H*S80*DSQI
        FPBE=CONEK(N)*DSQI*(C80H*C80-S80***2)
        RETAF(N)=BETAEN(N)-FBE/SPRE
        BETAC(N)=BETAZIN(N)+BETAEN(N)
        41 CONTINUE
        IF(ILINK.LT.4) RETURN
        DO 61 L=1,NOPS1
            Y(1,7*N+L+99)=007XICOSE(1,L,N).1.XMONL1(1,N).1.NOPS1
        61 CONTINUE
        IF(.NOT.NRIGID) RETURN
        DO 62 L=1,NOPS1
            IF((Y(1,7*N+L+99))*JFLAP(L)).LE.0.) G3 TO 62
            PSIR=PSIREFINI+OPSI(L,N)
            XMOMBH=Y(1,7*N+L+99)*RBH(N)
            PMOM(N)=PMOM(N)+XMOMBH*COS(PSIR)
            RMOM(N)=RMOM(N)+XMOMBH*SIN(PSIR)
            XMONL1(L,N)=0.
            JFLAP(L)=10
        62 CONTINUE
        DO 63 L=1,NOPS1
            Y(1,7*N+L+99)=D07XICOSE(1,L,N).1.XMONL1(1,N).1.NOPS1
            IF(JFLAP(L).NE.10) GC TO 63
            PSIR=PSIREFINI+OPSI(L,N)
            XMOMBH=Y(1,7*N+L+99)*RBH(N)
            PMOM(N)=PMOM(N)+XMOMBH*COS(PSIR)
            RMOM(N)=RMOM(N)+XMOMBH*SIN(PSIR)
            Y(1,7*N+L+99)=0.
        63 CONTINUE
        RETURN
407 FORMAT (6X,10F12.5)
408 FORMAT (24X,8F12.5)
424 FORMAT (12X, AZIMUTH U-SHAFT V-SHAFT W-SHAFT

```

```
1 XK SIN(BETA) COS(BETA) BETA DOT//  
2 12X, 6F12.5/1H0,  
3 9X, *RAD STA. PHI  
40 MACH LOCAL VI LOC LAMBDA UT CL UP//  
425 FORMAT (13X, *RADIAL FLOW UR GAMMA UPR PHI CL UP//)  
1CD MACH END
```

```
DDR03250  
DDR03260  
DDR03270  
DDR03280  
DDR03290  
DDR03300  
DDR03310
```

```

SUBROUTINE ELEC (GAIN1
COMMON /TRONIC/ UU(6),VV(6),TAU(22),DAMP(22),NUMRTS,GAINB,
INDEX,STGAIN(6),TSTAR,CDELTD,SLOT(3,9),
1 GAIN=1
IX=TNC
DO 20
IX=IX
U=UU(1
V=VV(1)
IF(V.EQ.0.) GO TO 15
IF(V.NE.-VV(1+1)) GO TO 16
Z=1./UU*2+VV*2)
TAU(IX)=Z
DAMP(IX)=-2.*Z*U
GAIN=GAIN/Z
GO TO 20
15 CONTINUE
DAMP(IX)=-1./U
GAIN=-GAIN*U
GO TO 19
16 CONTINUE
DAMP(IX)=0.
19 CONTINUE
TAU(IX)=0.
20 CONTINUE
IF(NUMRTS.GE.3) RETURN
IX=IX+1
TAU(IX)=0.
DAMP(IX)=0.
UU(3)=0.
VV(3)=0.
RETURN
END

```

```

ELEC0010
ELEC0020
ELEC0030
ELEC0040
ELEC0050
ELEC0060
ELEC0070
ELEC0080
ELEC0090
ELEC0100
ELEC0110
ELEC0120
ELEC0130
ELEC0140
ELEC0150
ELEC0160
ELEC0170
ELEC0180
ELEC019C
ELEC0200
ELEC0210
ELEC0220
ELEC0230
ELEC0240
ELEC0250
ELEC0260
ELEC0270
ELEC0280
ELEC0290
ELEC0300
ELEC0310
ELEC0320
ELEC0330

```

SURROUNTING GUST (J)
 COMMON /STAMAN/ H(12)•XX•YY•AY1•GOV•KPD•QPC•000.
 R1Y•APBG•ARBG•ASEP•AYBG•BWTC.
 RC•BWTM•RWTM•CGRL•DPIX•DPIZ.
 FMP(12)•R550•ALERT•AYDMX•DELT12.
 DPIX12•DTBWT•DNLLCG•HDELT•HGUST.
 HLTR11•HLTR2•ITORS•KTCTR•OMEGM.
 PCDEL•OMRSA•RMASS•TRALT•TWOPI•VGUST.
 ISTOP•XAGUN•XAPYL•XARSP(2)•YAGUN.
 YARSP(2)•YGUST•ZAGUN•ZAPYL•ZARSP(2).
 DELT2R•DSTACG•EIMAST•GPREL•HLPYLD.
 I BRAKE•OMEGMD•QRRAKE•BETA2S(2).
 PCG0E9•PCGMAX•PCRATE•P010TR•RDELT1.
 RDELT2•RITORS•TRIND2.
 Q•AP•PEN•QMG•TZM•TIM•T2M.
 TZT•T1T•T2T•ALEL•CZET•PSDD.
 SZET•TAXL•TAXR•XAMG•XLNK(16)•ZAMG.
 ALCYP•ALFIN•ALLNG•ALRNG•CDELE•COFIN.
 CDLNG•CDRNG•CLELE•CLFIN•CLLNG•CLRNG•CWING.
 CYCRI•CYCR2•CZET4•CZET6•CZET9•RANGE.
 SZET5•SZET7•SZET8•WGCOL•XAELF•XAFIN.
 XAFUS•XAET•YAFIN•ZAELE•ZAFIN•ZAFUS.
 YAEL•YAFUS•YALNG•YARMG•YALJET•YARJET.
 ZAJET•ALECRI•ALGFDP•BOTTOM•CZET11.
 CZET12•CZET13•EIZETA•HALFPI•SZET10.
 XAPYLD•YGUSTW•ZAPYLD•ZFLWG1•ZFRWG1
 •T2MS•TMS•T2MS•T2TS•TITS•T2TS.
 CLOCK•FLOCK•TCLOCK•TCLOCK
 ZZ•VXS(2)•VYS(2)•VZS(2)•BETA(12•2).
 T•PCC(2)•COSE(7.7.2)•BETAN(2)•BETAX(2)•BETAZ(2).
 AIB(2)•APDD•AOD•AYDD•AIR(2).
 OPSI(12•2)•DTRR•NPSI(2)•Z2TR.
 BETAD(12•2)•BNPSI(2).
 COND2•GMAXV•RATE1•RATE2•STOP2.
 THROT(2)•TRIND•XGUST•BETAZD(2)•GMAXVI.
 GMAXV2•GMAXV3•GUSTY•HNPSSIR(2).
 HUBKPS•HUBKRS•HUBTPS•HUBTRS.
 KONFIG•LNGLTH1•PILGH1•PSIREF(2).
 START2•XMONL(12•2).
 RM•RTR•ORM•DRTR•TMT•T1TT.
 T2MT•T2TT•T2MT•T2TT•XMAIL•XMAIL.
 XMB1•XMBIT•AIBPM•AIBPT•AIBRM•AIBRT.
 APTD•APTD•ARTD•ARTD•PSD•PSDT.
 XSTAHH•XSTAHT•YSTAHM•YSTAH.
 HUBKP•HUBKTP•HUBKR•HUBKTR
 •AZETA•AZETAT•VZETA•VZETAT
 RETAE(2)•HGUSTE•HGUSTF•HGUSTW•VGUSTE.
 VGUSTW•YGUSTF•GFWD•GLAT•GVERT.
 VXB•VZB•APD•VYB•ARD•AYD.
 COLSTK•CYSTK1•CYSTK2•PEDAL•AYE.
 APE•ARE•AIM•B1M•A1TR•B1TR.
 XAR(2)•YARI(2)•ZAR(2).
 VIMR•VITR•ZETA•ZETATR•HMR•HTR.
 COMMON /MANAL/
 1 2 3 4 5 6 7 * * * * *
 COMMON /ROMAN/
 1 2 3 4 5 6 7 * * * * *
 COMMON /MANARD/
 1 2 3 4 5 6 7

```

A REAL LNGTH1
DIMENTION XSTA(7) .AGUST(7)
XSTA(1)=SORT((XX**2+YY**2)-XGUST
CALL RATS (XAR(1)).YAR(1)).ZAR(1).AYE.APE.ARE.STA.BL.TV.1)
XSTAHM=XX+STA
YSTAHM=YY+BL
CALL RATS (XAR(2)).YAR(2).ZAR(2).AYE.APE.ARE.STA.BL.TV.1)
XSTAHT=XX+STA
YSTAHT=YY+BL
CALL RATS (XAFIN,YAFIN,ZAFIN,AYE,APE,ARE,STA,BL.TV.1)
XSTA(2)=SORT((XX+STA)**2+(YY+BL)**2)-XGUST
CALL RATS (XAELE,0..ZALE,AYE,APF,ARE,STA,BL.TV.1)
XSTA(3)=SORT((XX+STA)**2+(YY+BL)**2)-XGUST
CALL RATS (XAWG,0..ZAWG,AYE,APE,ARE,STA,BL.TV.1)
XSTAM=SORTE((XX+STA)**2+(YY+BL)**2)-XGUST
K=7
IF(QMG.LT.QI K=4
DO 208 M=1,4
AGUST(M)=0.
AGUST(M+3)=0.
BILL=M
208 XSTA(M+3)=XSTA(M+.5-.25*BILL)*CWING
GUSTYP=J
IF(J.EQ.10.DR.J.EQ.12) GO TO 224
DO 207 M=1,K
IF(XSTA(M).GE.LNGTH1) GO TO 100
IF(XSTA(M).LF.O.) GO TO 207
AGUST(M)=XSTA(M)*RATE1
GO TO 207
10C IF(XSTA(M).GE.STOP2) GO TO 101
IF(XSTA(M).LE.START2) GO TO 102
AGUST(M)=GMAXV3+XSTA(M)*RATE2
GO TO 207
101 AGUST(M)=GMAXV
GO TO 207
102 AGUST(M)=GMAXV1
207 CONTINUE
GO TO 232
224 DO 206 M=1,K
1 AGUST(M)=GMAXV1*(SIN(XSTA(M))*PLGH1)**2
1 IF(XSTA(M).GT.START2.AND.XSTA(M).LT.STOP2)
1 AGUST(M)=GMAXV2*(SIN(XSTA(M))-START2)*PLGH1)**2
206 CONTINUE
232 AGUST=AGUST(4)
1 IF(K.EQ.7) BGUSTW=.25*(AGUST(4)+AGUST(5)+AGUST(6)+AGUST(7))
1 IF(J.GT.1) GO TO 233
CALL PATS (0..0..0..BGUSTW,AYE,APE,ARF,HGUSTW,YGUSTW,VGUSTW,-1)
CALL PATS (0..0..0..AGUST(3).AYF,APF,ARE,HGUSTE,TV,VGUSTE,-1)
CALL RATS (0..0..0..AGUST(2).AYE,APE,ARE,HGUSTF,YGUSTF,TV,-1)
CALL RATS (0..0..0..AGUST(1).AYE,APE,ARE,HGUST,VGUST,-1)
3FTURN

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```
23 CALL RATS (BGUSTW,0.,0.,AYE,APE,ARE,MGUSTW,YGUSTW,YGUSTW,-1)
CALL RATS (AGUST(3),0.,0.,AYE,APE,ARE,MGUSTE,TY,YGUSTE,-1)
CALL RATS (AGUST(2),0.,0.,AYE,APE,ARE,MGUSTF,YGUSTF,TY,-1)
CALL RATS (AGUST(1),0.,0.,AYF,APF,ARE,MGUST,YGUST,YGUST,-1)
RETURN
END
```

GUST1090

GUST1100

GUST1110

GUST1120

GUST1130

GUST1140

```

-- SUBROUTINE INIT
COMMON /FORCE/ A(71)
COMMON /STRIM/ AY,VH,AGM,DT1(2),DT2(2),IX2,
  1 QMR,XXD,YD,ZZD,ALGF,APFP,AYFP,
  2 CGML,COLL(6),CYCF(3),CYCL(3),
  3 DIST,KCIT(20),PEDA(3),QMAX,
  4 QMRS,TIM,TMAX,XCIT(20,6),ALGEZ,
  5 ALGE1,ALGE2,CGSTA,CPWIC,DIX12,
  6 DIVIX,DIZIY,DT2MT,DT2ML,DT2T1,FTKTS,
  7 HUBKM(2,2),HUBKI(2,2),
  8 KREAD,PIU30,TSTAB(14),ZMAX2,ZMAX3,
  9 ASECDL,CYPMIC,GFARAT,PSDS50,
  PSISTP,QXBRAK,RUDIND,ZOELT1,ZOELT2
  COMMON /STAMAN/ HL(21),XX,YY,AY1,GOV,KPD,QPC,QQQ,
  1 RIV,APBG,ARBG,ASEP,AYBG,BWTIC,
  2 RC,BWTK,BWTM,CGAL,DOPIX,DP12,
  3 FMPT(2),R550,ALERT,AYDNX,DELT2,
  4 DPIXZ,DTBWT,DMLCG,MDELT,MGUST,
  5 HLTR1,HLTR2,ITORS,KTCTR,DMEGM,
  6 PCDEL,QMRS,AMASS,TRALT,TWDPI,VGUST,
  7 ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,
  8 YARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
  9 DELT2R,OSTACG,FIMAST,GRFELD,HPYLD,
  A IBRAKE,OMEGMD,QRRAKE,BETAZS(2),
  B PCGDED,PCGMAX,PCRATE,PO1DTR,ROELT1,
  C ROELT2,RIITRS,TRIND2
  COMMON /MANAL/
  1 Q,AP,PED,OMG,T2M,TIM,T2M,
  2 T2T,T1T,T2T,ALEL,CZET,PSDD,
  3 SZFT,TAX,XANG,XLM(16),ZANG,
  4 ALCYP,ALFIN,ALLWG,ALRWG,CDELE,CDFIN,
  5 CDLWG,CDRWG,CLELE,CLFIN,CLLWG,CLRNG,CWING,
  6 CYCR1,CYCZR2,CZET4,CZET6,CZET9,RANGE,
  7 SZETS,SZFT7,SZET8,WGCOL,XAEL,XAFIN,
  8 XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,
  9 YAEL,YAFUS,YALWG,YARWG,YALJET,YARJET,
  A ZAJET,ALECRI,ALGFPD,BDTOM,CZET11,
  B CZET12,CZET13,EIZETA,HALFP1,SZET10,
  C XAPYL,YGUSTW,ZAPYL,ZFLWG1,ZFRWG1
  D .T2MS,T1MS,T2MS,TZTS,TITS,T2TS,
  E CLOCK,FLOCK,XLOCK,TCLOCK
  F T,PCC(2),COSE(7,7,2),BETA(12,2),
  G * * * * * T,PCC(2),COSE(7,7,2),BETA(12,2),BETA(12,2),
  H AIB(2),APD0,ARD0,AYD0,AIR(2),
  I DPSI(12,2),DTRR,NPSI(2),ZZTR,
  J BETAU(12,2),BNPSI(2),
  K COND2,GMAXV,RATE1,RATE2,STOP2,
  L THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
  M GMAXV2,GMAXV3,GUSTYD,HNPSTR(2),
  N HUBKPS,HUBKRS,HUBTPS,HUBTRS,
  O KONFIG,LNGTH1,PILGH1,PSIREF(2),
  P START2,XMOMLI(12,2),
  Q RM,RTR,ORM,ORTR,TINT,TITT,
  R T2MT,T2TT,T2MT,T2TT,XMALT,XMALT,
  S XMB1,XMB1T,AIBPM,AIBPT,AIBRM,AIBRT,
  T

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```

C      APTD. APTD. APTD. PSD. PSD.
D      XSTAHM. XSTAHM. XSTAHM. XSTAHM.
F      HUBKP. HUBKTP. HUBKR. HUBKTR
      •AZETA. AZETAT. VZETA. VZETAT
      •VZUSTW. YGJSTIF. GFWD. GLAT. GVERT.
      VXB. VZB. APO. VYB. ARO. AYD.
      C0LSTK. CYSTKL. CYSTK2. PEDAL. AYE.
      APE. ARE. AIM. BIM. ALTR. BLTR.
      XAR(2). YAR(2). ZAR(2).
      VIMR. VITR. ZETA. ZETATR. HMR. HTR.
      TMR. TR. QMX. QTR. YMRF. YTRF
      AH(3). AL(3). EXIT. ICOM(49). IPSN.
      NPART. NVARA. NVARB. NVARC. NSCALE
      •NVARS. NPRINT. NTIME
      Y(4.150)
1     COMMON /FORY/
      DATA HEAD1/   MAIN      FWD      RIGHT     TAIL      LEFT   /
      DATA DTR1/57.2957795/
      DATA DTR / -1745329E-01/
      DIMENSION HEAD1(2.6).PAR(191)
DO 78 J=1,7
PAR(J+135)=0.
PAR(J+142)=Y(1. J+106)*DTR1
PAR(J+149)=Y(1. J+11)*DTR1
PAR(J+156)=Y(1. J+17)*DTR1
PAR(J+163)=0.
PAR(J+170)=Y(1. J+113)*DTR1
PAR(J+177)=Y(1. J+38)*DTR1
PAR(J+184)=Y(1. J+24)*DTR1
78 CONTINUE
DO 91 N=1,2
NPSIN=NPSI(N)
IF(NPSIN.EQ.0.) GO TO 91
K=28*N+107
DO 90 J=1,NPSIN
K=K+
PAR(K)=(Y(1. N+6)+DPSI(J, N))*DTR1
IF(PAR(K).GE.-360.) PAR(K)=PAR(K)-360.
IF(PAR(K).LT.0.) PAR(K)=PAR(K)+360.
90 CONTINUE
91 CONTINUE
DO 79 J=1,3
JJ=4-J
PAR(J+70)=Y(1. J+89)
PAR(J+76)=Y(1. J+14)
PAR(J+82)=Y(1. J+75)
PAR(J+88)=Y(1. JJ+78)*DTR1
PAR(J+89)=Y(1. J)
PAR(J+92)=Y(1. J+3)*DTR1
PAR(J+96)=Y(1. J+84)*DTR1
PAR(J+99)=Y(1. J+ 9)*DTR1
79 CONTINUE
PAR(1)=APTD*DTR

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PAR(2)=ARTD*DTRR
PAR(3)=VXS(1)
PAR(4)=Y(1,84)*DTRR
PAR(5)=Y(1,107)*DTRR
PAR(6)=TMR
PAR(7)=AIM*DTRR
PAR(8)=DIM*DTRR
PAR(9)=VYS(1)
PAR(10)=V(1,9)*DTRR
PAR(11)=Y(1,32)*DTRR
PAR(12)=HMR
PAR(13)=VZS(1)
PAR(14)=Y(1,7)*DTRR
PAR(15)=Y(1,18)*DTRR
PAR(16)=YHRF
PAR(17)=T2M*DTRR
PAR(18)=T1M*DTRR
PAR(19)=T2M*DTRR
PAR(20)=BETA0(1)*DTRR
PAR(21)=ZETA4*DTRR
PAR(22)=QMX
PAR(23)=T2MT*DTRR
PAR(31)=T1MT*DTRR
PAR(32)=T2MT*DTRR
PAR(33)=T2MT*DTRR
PAR(23)=PAR(31)-PAR(17)
PAR(24)=PAR(32)-PAR(18)
PAR(25)=PAR(33)-PAR(19)
PAR(26)=VIMR
PAR(27)=PSD*PIU3C
PAR(28)=QMX*PSD550
PAR(29)=BETAX(1)*DTRP
PAR(3C)=HUBKP*DTR
PAR(34)=BETAN(1)*DTR
PAR(35)=HUBKR*DTR
PAR(36)=APTTD*DTRR
PAR(37)=ARTTD*DTRR
PAR(38)=VXS(2)
PAR(39)=PAR(4)*GEARAT
PAR(40)=Y(1,114)*DTRR
PAR(41)=TTR
PAR(42)=A1TR*DTRR
PAR(43)=B1TR*DTRR
PAR(44)=VYS(2)
PAR(45)=PAR(10)*GEARAT
PAR(46)=Y(1,39)*DTRR
PAR(47)=HTR
PAR(48)=VZS(2)
PAR(49)=Y(1,6)*DTRR
PAR(50)=Y(1,25)*DTRR
PAR(51)=YTRF
PAR(52)=T2T*DTRR
PAR(53)=T1T*DTRR
PAR(54)=T2T*DTRR
PAR(55)=REYAC(12)*DTRP

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PAR(56)=ZETATR*DTRR
PAR(57)=QTR
PAR(66)=T2TT*DTRR
PAR(67)=T1TT*DTRR
PAR(68)=T2TT*DTRR
PAR(69)=PAR(66)-PAR(52)
PAR(70)=PAR(67)-PAR(53)
PAR(60)=PAR(68)-PAR(54)
PAR(61)=VTR
PAR(62)=PAR(27)*GEARAT
PAR(63)=OTR*PSD550*GEARAT
PAR(64)=BETAX(2)*OTRF
PAR(65)=HUBKTP*OTR
PAR(66)=BETAN(2)*DTRR
PAR(70)=HUBKTR*DTR
PAR(74)=DIST
PAR(75)=V*FTKTS
PAR(76)=AYFP*OTRR
PAR(80)=-PAR(79)
PAR(81)=VH*FTKTS
PAR(82)=APF*OTR
PAR(89)=Y(1.89)*OTRRI
PAR(96)=Y(1.14)*OTRR1
PAR(103)=COLSTK
PAR(104)=CYSTK1
PAR(105)=ALLWG*DTRR
PAR(106)=ALRWG*DTTR
PAR(107)=ALEL*DTRR
PAR(108)=ALFIN*DTRR
PAR(109)=AY*OTRR
PAR(110)=CGSTA
PAR(111)=MGUST
PAR(112)=--GFMD
PAR(113)=CYSTK2
PAR(114)=CLLMG
PAR(115)=CLRNG
PAR(116)=CLELE
PAR(117)=CLFIN
PAR(118)=AP*OTRR
PAR(119)=CGBL
PAR(120)=YGUST
PAR(121)=GLAT
PAR(122)=PEDAL
PAR(123)=CDLWG
PAR(124)=CDRMG
PAR(125)=CDELE
PAR(126)=CDFIN
PAR(127)=CGML
PAR(128)=VGUST
PAR(129)=GVERT
PAR(130)=TAXR
PAR(131)=OMRS
PAR(132)=OMR*PSD550
PAR(133)=JAXL

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PAR(134)=OMRS*PSD550
PAR(135)=OBRAKE
WRITE (31) IPSN,T,PAR,A,XMB1,XMA1,XMBIT,XWAIT
TIME, 191 PAR-S, 75 A-S = 267 TOTAL
NTIME=NTIME+1
IF(NTIME.GE.NPRINT) NTIME=0
IF(NTIME.NE.0) RETURN
CALL TIME(X(TUSED,DTIME,TELEFT))
WRITE(6,80) T,TUSED
WRITE (6,81) (HEAD1(J,KONFIG),J=1,2),(PAR(J),J=1,35)
WRITE (6,81) (HEAD1(J,KONFIG+3),J=1,2),(PAR(J),J=36,70)
WRITE (6,82) (PAR(J),J=71,82)
WRITE (6,83) (PAR(J),J=83,102)
WRITE (6,84) (PAR(J),J=103,129)
WRITE (6,85) (PAR(J),J=130,135)
CALL WRFM
WRITE (6,86)
WRITE (6,87) (HEAD1(J,KONFIG),J=1,2),(PAR(J),J=136,163)
WRITE (6,87) (HEAD1(J,KONFIG ),J=1,2),(PAR(J),J=164,191)
RETURN
80 FORMAT (1H1,10X,F8.3*X,'SECONDS MANEUVER TIME',*10X,
     1          F8.3*X,'MINUTES ELAPSED COMPUTING TIME',*10X,
     2          *L6,FT,DEG,SEC UNITS')
81 FORMAT (1H0,4X,2A4,'ROTOR SHAFT REFERENCE',
     1          28X,0/A1,6X,'P/B1',37X,'PSI',7X,'BETA',*7X,'FORCES',/
     2          14X,'VELOCITY ',*2F10.3,6X,'U ',*F8.3,
     3          6X,'ACCEL ',*2F10.3,6X,'THRUST ',*F10.3/
     4          14X,'LOCATION ',*2F10.3,6X,'V ',*F8.3,
     5          6X,'VELOCITY ',*2F10.3,6X,'H-FORCE ',*F10.3/
     6          49X,4W,*F8.3,
     7          6X,'LOCATION ',*2F10.3,6X,'Y-FORCE ',*F10.3/
     8          7X,'FROM',7X,'COLLEC F/A CYC LAT CYC',
     9          7X,'CONTROLS ',*3F8.3,3X,'CONING ',*F8.3,
     A          3X,'M.TILT ',*F9.3,3X,'TOPO ',*F9.2,
     B          3X,'FLAP, LIM ',*6X,'HUB SPRINGS',/
     C          7X,'OTHER ',*3F8.3,3X,'IND. V ',*F8.3,
     D          3X,'RPM ',*F9.3,3X,'HP ',*F9.2,
     E          3X,'UPPER ',*F7.3,3X,'F/A ',*F8.1,
     F          7X,'TOTAL ',*3F8.3,57X,'LOWER ',*F7.3,
     G          3X,'LAT ',*F8.1)
82 FORMAT (1H0,5BX,'GROUND REFERENCE',/
     1          38X,*X*,9X,*Y*,9X,*Z*,24X,'SPEED (KTS)   FLT PATH ANGLES',/
     2          22X,'VELOCITY ',*3F10.3,*DISTANCE ',*F8.1,
     3          * AIR ,*F7.2,*,HEADING ,*F8.3,
     4          22X,'LOCATION ',*3F10.3,*,ALTITUDE ,*F8.1,
     5          * GND ,*F7.2,*,CLIMB ,*F8.3)
83 FORMAT (1H0,57X,'FUSELAGE REFERENCE',/
     1          20X,*U*,9X,*V*,9X,*P*,9X,*Q*,9X,*R*,*
     2          7X,*BOWWT*,5X,*EULER ANGLES FROM GROUND',/
     3          5X,*ACCEL *,5X,*F10.3,18X,*PSI*,6X,*THETA*,6X,*PHI*/,
     4          5X,*VELOCITY ',*7F10.3,3X,*VELOCITY ',*3F10.3,
     5          88X,*LOCATION ',*3F10.3)
84 FORMAT (1H0,6X,'CONTROLS (PCT)',/
     7X,*COLSTK*,5X,F7.2,RX,'L. WING R. WING',
     1          *INIT2170
     INIT2180
     INIT2190
     INIT2200
     INIT2210
     INIT2220
     INIT2230
     INIT2240
     INIT2250
     INIT2260
     INIT2270
     INIT2280
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     INIT2560
     INIT2570
     INIT2580
     INIT2590
     INIT2600
     INIT2610
     INIT2620
     INIT2630
     INIT2640
     INIT2650
     INIT2660
     INIT2670
     INIT2680
     INIT2690
     INIT2700

```

```

? 4X, *ELF1, *FX, *FIN/RUN FUSELAGE, *7X, *C.G. LOC (INI)..
? 6X, *GUST (CG) G-S*, / INIT2710
? 7X, *F/A CYCSTK *F7.2, * ATK *4F9.3, INIT2720
? ATKV *FB.3, STA, LINE *F7.2, INIT2730
? FWD *FS.1, FWD *F5.2/ INIT2740
? 7X, *LAT CYCSTK *F7.2, CL *4F9.3, INIT2750
? ATKP *F8.3, B. LINE *F7.2, INIT2760
? LAT *F5.1, LAT *F5.2/ INIT2770
? 7X, *PEDAL *6X.F7.2, CD *4F9.3, *17X.*W. LINE *F7.2, INIT2780
? VERT *F5.1, VERT *F5.2/ INIT2790
R FORMAT (1HO.34X, *JET THRUST*13X, *ENGINE*/ INIT2800
INIT2810
? 35X, *RIGHT/CENTER *F8.1, TORQUE *
? F9.1, TOTAL HP RQD *6X.F8.1/ INIT2820
? 35X, *LEFT, *O.X.F8.1, SHAFT HP *F9.1, INIT2830
? ROTOR BRAKE TORQUE *F8.1) INIT2840
INIT2850
A6 FORMAT (INI)
?7 FORMAT (1HO.59X,2A4, *ROTOR// INIT2860
? 4BX, *BLADE 1 BLADE 2, BLADE 3 BLADE 4 BLADE 5, / INIT2870
? 3X, *BLADE 6 BLADE 7, / INIT2880
? 18X, *AZIMUTH LOCATION *7F10.3/ INIT2890
? 18X, *FLAPPING ACCEL WRT MAST *7F10.3/ INIT2900
? 18X, *FLAPPING VELOCITY WRT MAST *7F10.3/ INIT2910
? 18X, *FLAPPING LOCATION WRT MAST *7F10.3) INIT2920
INIT2930
INIT2940

```

END

```

SUBROUTINE INRO
COMMON /STRIAB/
D(21),DT(21),E(79),F(10),X(10),
OL,DM,DN,OY,DZ,IK,IY,IZ,PD(10,11).
2
DTR,EPD,ERR(10),KMI,RHO,
R12,SPD(6,6,3),XBM(21),XEL(14),
XER(7),XFC(28),XFN(7),XFS(35),
XGN(7),XIT(21),XRM(49),XTR(49).

XMR MUST HAVE ITS NAME CHANGED HERE TO AVOID CONFLICT
WITH ARGUMENT
      XWG(21),YMR(21),YTR(21),YNG(21),
      YEL(21),YFN(21),BLCG,DAMP,DEPD(10),
      EPDS,EPDX(10),MASS,QSVI,TMRS,TTRS,
      MLCG,XCON(63),XJET(14),XMNR,AYEFFP,
      BETAES(2),CNPCD,DMDO,DYDOR,GUESS,
      NPASS,POPHI(10,11),STACG,ZERD,
      XMAST,DHADAO,DODCOL,DTRSSO,DYBDR,
      ENGRPM,4XPASS,PSD30P,TRIND1,XLIMIT
      HL(21),XX,YY,AY1,GOV,KPD,QPC,000,
      RIV,APBG,ARBG,ASE,AYBG,BWTC,
      RC,BMTK,BMTM,CGBL,DPIX,DPIZ,
      FHPT(2),R550,ALERT,AYDMX,DEL12,
      OPIXZ,DBWT,DWLCC,MODELT,MGUST,
      HLTR1,HLTR2,ITORS,KTCTR,OMEGM,
      PCDEL,QMRS,A,RCMASS,TRALT,YWOP1,YGUST,
      ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,
      YARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
      DELT2R,DSSTACG,E,MAST,GPREDL,HLPYLD,
      1BRAKE,OMEGMO,OBRAKE,BETA2S(2),
      PGOED,PGCMAX,PCRATE,PO10TR,ROELT1,
      RDELT2,RITORS,TRIN02,
      COND2,GMAXV,RATE1, RATE2,STOP2,
      THROT(2),TRIND,XGUST,BETAZD(2),GMAXVL,
      GMAXV2,GMAXV3,GUSTP,HMPSR(2),
      HUBKPS,HUBKRS,HUBTPS,HUBTRS,
      KONFIG,LNGTH1,PILGH1,PSIREF(2),
      START2,XMOML1(12,2),
      R(2),OR(2),T1(2),
      TZ(2),TZ(2),XMA(2),
      XMB(2),AIBP(2),AIBR(2),
      APDR(2),ARDR(2),PS10(2),
      XSTAH(2),YSTAH(2),
      HUBKPR(2),HUBKRP(2),
      HAZETAR(2),VZETAR(2),
      AMI(2),CT,P1,XB(2),ALT,AOR(2),EXH(2),
      NXR(2),RBH(2),SWC(2),UHS,CDH(2),LRD(2),
      RAIB(2),RTTP(2),TAIR(14),CONEK(2),FVIND,
      NAVARD,
      SWKRI(2),SWKRR(2),TIP18(2),TIP38(2),
      TWIST(20,2),CLRACK(2),DELTAA(2),
      INR00010
      INR00020
      INR00030
      INR00040
      INR00050
      INR00060
      INR00070
      INR00080
      INR00090
      INR00100
      INR00110
      INR00120
      INR00130
      INR00140
      INR00150
      INR00160
      INR00170
      INR00180
      INR00190
      INR00200
      INR00210
      INR00220
      INR00230
      INR00240
      INR00250
      INR00260
      INR00270
      INR00280
      INR00290
      INR00300
      INR00310
      INR00320
      INR00330
      INR00340
      INR00350
      INR00360
      INR00370
      INR00380
      INR00390
      INR00400
      INR00410
      INR00420
      INR00430
      INR00440
      INR00450
      INR00460
      INR00470
      INR00480
      INR00490
      INR00500
      INR00510
      INR00520
      INR00530
      INR00540

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5 LAMBDA(2)=UPGUST, URGUST, UTGUST, WRDTDR.
6 ERI(2)=ERX(2).
7 XLIIMAX(2)=XLIMIN(2)
DIMENSION XMR(49),HUBKS(2,2),ZETAR(2),BH(2),BAIB(2),B(2)
1 DROT(21,2)
EQUIVALENCE (HUBKS(1,1),HUBKPS),(DRDT(1,1),O(1))
VXS(N)=0.
VYS(N)=0.
VZS(N)=0.
LROT(N)=0.
ARDR(N)=0.
APDR(N)=0.
AIBP(N)=0.
AIBR(N)=0.
C
      BETAZ = INPUT PRE-CONE ANGLE
      BETAE = DEFLECTION FROM BETAZ DUE TO BLADE BENDING
      C
      BETA0 = CONING ANGLE = BETAZ + BETAE
      C
      AZETAR(N)=0.
      BETAZD(N)=0.
      NPSS(N)=12
      R(N)=XMR(4)
      IF(R(N).NE.0.) GO TD 12
      R(N)=1.
      S(N)=0.
12 CONTINUE
      C=XMR(5)*R12
      CONEK(N)=XMR(6)*DTR
      BETAN(N)=XMR(7)*DTR
      XARSP(N)=STACG-XMR(8)*R12
      YARSP(N)=XMR(9)*R12-BLCG
      ZARSP(N)=WLCG-XMR(10)*R12
      ZETAR(N)=XMR(11)*DTR
      HL(N)=XMR(12)
      FHPT(N)=XMR(16)
      HUBKPR(N)=XMR(17)*DTR
      HUBKRR(N)=XMR(18)*DTR
      SMKR1(N)=XMR(19)*DTR
      EXH(N)=XMR(21)
      BETAZ(N)=XMR(22)*DTR
      PCC(N)=XMR(23)
      IF(N.EQ.2) PCC(N)=XMR(23)*TRIND
      DELTA3(N)=TAN(XMR(24)*OTR)
      CJMB(N)=XMR(25)
      CLRADK(N)=XMR(26)*TWOPI*C/(57.3*(C**4.*R(N)))
      OCAF(N)=XMR(27)
      NRAD = NXR(N)
      DO 11 I=1,NRAD
      TWIST(I,N)=-XMR(I+28)*OTR
11 CONTINUE
      SMKR2(N)=SMKR1(N)

```

```

C(R(N))=PSI0(N)*R(N)
BETAZS(N)=BETAZ(N)
BETAZ(N)=2.*BETAZ(N)-BETAN(N)
RTAPI(N)=1./((TWOPI*RHO*R(N))*#2)
XB(N)=.05
IF(INRAD,NE,0) XB(N)=1./NRAD
TIP1(N)=.125-.00625*NRAD
TIP38(N)=3.*TIP18(N)
ACR(N)=(EXH(N)/R(N))**2
BH(N)=.5*B(N)
IF(XMR(16).NE.0.) XMR(15)=XMR(16)
I=20.*XMR(15)/R(N)
RSO=R(N)**2
HNPsi=2.*QcC(R(N))*XB(N)
R10=.015RSO
R10 = IN * FT
R09=.2330821E-04*RSO*R(N);
R09 = IN * FT * SEC**2
DO=DR07(21,N)/R(N)
AIB(N)=1307.511*DD
CFX=2.052239*DD
RI=0.
RIMK=0.
K=21
RD=20.75
DO 57 I=1,20
K=K-1
RD=RD-1.
PDMK=RD*DR07(K,N)
CFX=CFX+RIMK+RDMK
AIB(N)=AIB(N)+RD*RDMK+RI*RIMK
RI=RD-.5
RIMK=RI*DR07(K,N)
IF(K.EQ.1M) GO TO 56
57 CONTINUE
58 CONTINUE
AMIN=CFX+R10
AIB(N)=AIB(N)+R09
DAIB(N)=B(N)*AIB(N)
AIR(N)=B(N)*AIB(N)
IF(C(N).LE.2.) AIR(N) =2.*AIB(N)
RBH(N)=0.
(F(BH(N)).NF.0.) RBH(N)=AIR(N)/BH(N)
RAIB(N)=0.
IF(AIR(N).NE.0.) RAIB(N)=1./A(R(N))
ECE=FHTN(N)/32.16
CALL NOPSIO (MNPSI,BH,N)
ECE=ECE*RAIB(N)
HUBKS1(N)=ECE
HUBKS2(N)=ECE
IF(FHTN(N).EQ.0.) GO TO 48
BETAZ(N)=0.
HUBKPR(N)=ECE*PS(D(N))**2
HUBMRR(N)=HUBKPR(N)
INR0109C
INR01100
INR01110
INR01120
INR01130
INR01140
INR01150
INR01160
INR01170
INR01180
INR01190
INR01200
INR01210
INR01220
INR01230
INR01240
INR01250
INR01260
INR01270
INR01280
INR01290
INR01300
INR01310
INR01320
INR01330
INR01340
INR01350
INR01360
INR01370
INR01380
INR01390
INR01400
INR01410
INR01420
INR01430
INR01440
INR01450
INR01460
INR01470
INR01480
INR01490
INR01500
INR01510
INR01520
INR01530
INR01540
INR01550
INR01560
INR01570
INR01580
INR01590
INR01600
INR01610
INR01620
186

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```

48 CONTINUE
  IF(BIN).EQ.0.) RETURN
  NPSIN=BIN)
  DO 10 I=1,NPSIN
    COSE(I,I,N)=1.
    IF(I.EQ.NPSIN) GO TO 10
    I=I+1
    DO 9 K=I1,NPSIN
      IF(ECE.NF.0.) GO TO 8
      COSE(I,K,N)=DCOS(6.283185307D0/NPSIN*(I-K))
      COSE(K,I,N)=COSE(I,K,N)
      GO TO 9
  8 CONTINUE
  COSE(I,K,N)=0.
  COSE(K,I,N)=0.
  9 CONTINUE
  10 CONTINUE
  RETURN
END

```

INR01630
INR01640
INR01650
INR01660
INR01670
INR01680
INR01690
INR01700
INR01710
INR01720
INR01730
INR01740
INR01750
INR01760
INR01770
INR01780
INR01790
INR01800
INR01810

```

SUBROUTINE ITRIM(LPASS)
COMMON /STRIAB/ DL(21),DT(21),EI(79),F(10),X(10),
DL•DM•DX•DY•NZ•IX•IY•IZ•PD(LC,11),
DTR•EPD•ERR(1•)•KMI•RHO,
R12•SPD16(6,3)•XBWI(21)•XEL(14),
XER(7)•XFC12(8)•XFN(7)•XFS(35),
XGN(7)•XIT12(1)•XMR(149)•XTR149),
XMG(21)•YMR(21)•YTR(21)•YMG121),
YFL(21)•YFN12(1)•BLCG•DAMP•DEPD(LC),
EPDS•EPDX(10)•MASS•QS1•TMRS•TTRS,
MLCG•XCON16(3)•XJFT(14)•XMIN•AYEFF,
BETAES(2)•CNPCD•DHADQ•DYBDR•GUESS,
UPASS•DPFH(10,11)•STACG•TZER,
XMAST•DHADAO•DODCOL•OTRSQ•DYBDR,
ENGRPM•MXPASS•PSD30P•TRINDL•XLIMIT
O•AP•PED•QMG•TZM•TIM•T2M,
T2T•T1T•T2T•ALEL•CZFT•PSDD,
SZFT•TAXL•TAXR•XAMG•XLNK116)•ZANG,
ALCP•ALFIN•ALLWG•ALRWG•CDELE•CDFIN,
CDLWG•CDRMG•CLFLG•CLFIN•CLLWG•CLRNG•CWING,
CYCRL•CYCR2•CZFT4•CZFT6•CZET9•RANGE,
SZTS•SZFT7•SZFT8•WGC•OL•XAFL•XAFTN,
XAFUS•XAJET•YAFIN•ZAELE•ZAFIN•ZAFUS,
YAELF•YAFUS•YALWG•YARMG•YALJET•YARJET,
ZAJET•ALECR1•ALGFDP•BOTOM•CZET11,
CZFT12•CZET13•E1ZFT•HALFPI•S2ZETIN,
XAPYLO•YGUSTW•ZAPYLD•ZFLWGL•ZFRWGL
•TZMS•TMS•T2MS•TZTS•TITS•T2TS,
CLOCK•FLCK•XLCK•TCLOCK
( V•(IND•NMAG•APBMT•ARBMT•AYBMT•BETAO(2)•TDEL,
 3ETA(2)•HGUSTE•HGUSTF•HGUSTW•VGUSTE,
 2VGUSTW•YGUSTF•GFWD•GLAT•GVERT,
 2VXB•VZB•APD•VYR•ARD•AYD,
 4COLSTK•CYSTK1•CYSTX2•PEDAL•AYE,
 5APE•ARE•AIM•RIM•AIRT•BLTR,
 6XAR(2)•YARI2)•ZARI2),
 7VIMP•VITR•ZETA•ZETATR•HMR•HTR,
 7TMR•TTR•QMX•QTR•YMRF•YTRF
COMMON /STANRD/ J•W•ITM•VHS(2)•LINK•QELE•VRDT(2),
 1VSND•YFIN(2)•ZFEL(2)•ALBAL12),
 2BIBAL(2)•COND1•SWING•PILGH2•PWGEL1,
 3BM•BTR•PMOMM•PMOMT•RMOMM•RMOMT
 1NPART•NVARA•NVARB•NVARC•NSCALE
 1COMMON /FORY/
 1DIMENSION VAR(11)
 1EQUIVALENCE (VAR11)•COLSTK)
 1COUNT=11
 1IF(BTR•FQ•0..1) COUNT=9
 1IF(BM•FO•0..1) COUNT=7
 1(IF(XFC(73)•NE•0..1) COUNT=7
 1IF(1TM•NE•0..1) COUNT=7
 1KMI=KCUNT-1

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```

NPASS=0
KPASS=-1
CALL TIMEX (TUSED,DTIMF,TLEFT)
5  NPASS=NPASS+1
KPASS=KPASS+1
IF(KPSS.EQ.1.PASS) KPSS=0
IF(ICONDI.NE.0.) WRITE (6,210) NPASS
J=1
BETAE(1)=BETAES(1)
BETAE(2)=BETAES(2)
TMR=TMR
TTR=TTRS
CALL AJAC08
IF(EXIT.NE.0.) GO TO 61
BETAES(1)=BETAE(1)
BETAES(2)=BETAE(2)
TMR=TMR
TTR=TTR
DO 40 K=1,KM1
40 PD(K,KOUNT)=-F(K)
DO 71 K=1,KM1
IF(ABS(F(K)).GT.DAMP) GO TO 72
71 CONTINUE
CALL DAMPER
72 CONTINUE
DO 73 K=1,KM1
73 IF(ABS(F(K)).GT.ERR(K)) GO TO 75
73 CONTINUE
GO TO 170
75 CONTINUE
IF(KPSS.GT.0) GO TO 56
J=2
CALL JACOBI
IF(EXIT.NE.0.) GO TO 61
IF(KOUNT.EQ.7)
1 CALL RATS ((Y(1,90),Y(1,91),Y(1,92),AYE,APE,ARE,VXB,VYB,VZB,-1)
IF(KOUNT.EQ.11) CALL PDZ(PD,AYEF)
IF(ICONDI.NE.0.) CALL MRVP (2,VAP,KM1,PD,TAXL,TAXR)
DO 47 I=1,KM1
PD(I,10)=-PD(I,10)
47 CONTINUE
56 CONTINUE
DO 48 J=1,KOUNT
48 PDMR(I,J)=PD(I,J)
CALL SOLVE
IF(EXIT.NE.0.) GO TO 10
CALL RATI(X,EPDX,XLIMIT,VAR)
DO 86 I=6,11
IF(LARS(VAR(I)).GT.HALFPI) GO TO 61
86 CONTINUE
IF(NPASS.LT.MPASS) GO TO 5
61 EXIT=1.
170 CONTINUE

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```
ITRI1090
ITRI1100
ITRI1110
ITRI1120
ITRI1130
ITRI1140
ITRI1150
ITRI1160
ITRI1170
ITRI1180

CALL PAPA (W,COND1)

10 RETURN
10 CONTINUE
10 WRITE (6,11)
10 RETURN

11 FORMAT (1HO,'THE PARTIAL DERIVATIVE MATRIX IS SINGULAR.'/
11          ' THIS IS PROBABLY CAUSED BY ONE OF THE CONTROLS BEING '
11          'UNCONNECTED.')
11C FORMAT (1H1/1H .50X,***** START OF ITERATION '13.' *****)
11C END
```

SUBROUTINE ITROT (N)
 COMMON /ANDCIT/ AL,B1,XK,XY,VI?,VI4,APDM,APFM,ARDM,ARFH,
 AYFM,RDTJ,XK43,XLIM,CBFAC,
 GDISK(120),N0PSI,TANAI,TANBL,
 TANTL,T'NT2,DCAFXK,IPRINT,NORADL,
 SHEARL(12),SHEARO(12),SHEARR(12),
 XMOML(12),XMOMO(12)
 ,APOS,AROS,PFAC,RFAC,AP OBS,ARBS
 22,VXS(2),VYS(2),VZS(2),BETA(12,2),
 T,PCC(2),COSE(7,7,2),BETAN(2),BETAX(2),BETAZ(2),
 AIR(2),APDO,ARDO,AYDO,AIR(2),
 DPS(112,2),DTRR,NPSI(2),ZZTR,
 BETAU(12,2),BNPSI(2),
 COND2,GMAXV,RATE1,RATE2,STOP?,
 THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
 GMAXV2,GMAXV3,GUSTYP,HNGS1R(2),
 HUBKPS,HUBKRS,HUATPS,HUBTRS,
 KUNFIG,LNGTH1,PILGH1,PSIREF(2),
 START2,XMOMLI(12,2),
 R(2),DR(2),T1(2),
 T2(2),TR(2),XMA(2),
 XMB(2),AIBP(2),AIBR(2),
 APDR(2),ARDR(2),PSID(2),
 XSTAH(2),YSTAH(2),
 HUBKPR(2),HURKRR(2),
 AZFTAR(?),VZETAR(2),
 I,V,IND,NWAG,APRM1,ARBMT,AYBMT,BETA0(2),TOFLT,
 BETAF(2),HGUSTE,HGUSTW,VGUSTE,
 VGUSTW,YGUSTF,GFWD,GLAT,GVERT,
 VXB,VZB,APD,VYR,ARD,AYO,
 COLSTK,CYSTK1,CYSTK2,FEDAL,AYE,
 APE,ARE,AIM,B1M,A1TR,B1TR,
 XAR(2),YAR(2),ZAR(2),
 VIR(2),ZFTAR(2),HFORCE(2),
 THRUST(2),TORQUF(2),YFORCE(2),
 J,W,ITM,VHS(2),LINK,QEL,E,VROT(2),
 VSND,YFIN(2),ZFFL(2),A1BAL(2),
 A1BAL(2),COND1,SWING,PILGH2,PMGEL1,
 ? B(2)*PMOM(2)*RDM(2)
 COMMON /RJSTAP/ AM(2),CT,P1,XR(2),ALT,AOR(2),EXH(2),
 ? NXR(2),RBH(2),SWC(2),UHS,CDHR(2),LRDT(2),
 RAIB(2),RTRP(2),TAIR(14),CONFK(2),DCAFR(2),FVIND,
 ? NVARD,
 ? SMKR(2),SMKR2(2),TIP18(2),TIP38(2),
 ? TWIST(20,2),CLRADK(2),DELTA3(2),
 ? LAMBDA(2),UPGUST,URGUST,WRDTOR,
 ? ER(2),ERX(2),
 ? XLIWAX(2),XLIMIN(2),
 ? COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
 ? NPART,IVARA,IVARR,IVARC,NSCALE
 ? ,IVARS,NPRINT,NTIME
 ? ? EAL LAMRDA
 ? DIMENSION AA(12,5),HEAD(2),HEAD1(11,2),HEAD2(4,5)
 ? EQUIVALENCE (AA(1,1),SHEARL(1))
 ? ITRO0010
 ? ITRO0020
 ? ITRO0030
 ? ITRO0040
 ? ITRO0050
 ? ITRO0060
 ? ITRO0070
 ? ITRO0080
 ? ITRO0090
 ? ITRO0100
 ? ITRO0110
 ? ITRO0120
 ? ITRO0130
 ? ITRO0140
 ? ITRO0150
 ? ITRO0160
 ? ITRO0170
 ? ITRO0180
 ? ITRO0190
 ? ITRO0200
 ? ITRO0210
 ? ITRO0220
 ? ITRO0230
 ? ITRO0240
 ? ITRO0250
 ? ITRO0260
 ? ITRO0270
 ? ITRO0280
 ? ITRO0290
 ? ITRO0300
 ? ITRO0310
 ? ITRO0320
 ? ITRO0330
 ? ITRO0340
 ? ITRO0350
 ? ITRO0360
 ? ITRO0370
 ? ITRO0380
 ? ITRO0390
 ? ITRO0400
 ? ITRO0410
 ? ITRO0420
 ? ITRO0430
 ? ITRO0440
 ? ITRO0450
 ? ITRO0460
 ? ITRO0470
 ? ITRO0480
 ? ITRO0490
 ? ITRO0500
 ? ITRO0510
 ? ITRO0520
 ? ITRO0530
 ? ITRO0540

```

DATA HEAD/ 4HMAIN.4HTAIL/
DATA HEAD1/  ROTOR FLAP CORRECTION EXCEEDS 90 DEGREES      ITAD0050
 1ANCE EXCEEDS ALLOWABLE ERROR      /      ROTOR BAL ITAD0050C
 1ADATE HEAD2/, AIRLOAD LIFT      AIRLOAD DRAG      ITAD0050
 1ING MOMENT INPLANE MOMENT*/      RADIAL DRAG      ITAD0050
 IF(BETAX(N).EQ.BETAN(N)) ITM=0      ITAD0050
 KBAL=0      ITAD0050
 TZRN=TZP(N)      ITAD0050
 VITER=0      ITAD0050
 287 KK=2      ITAD0050
 (FLITM.NF.0) GO TO 21      ITAD0050
 (F1(.EQ.-2.ANDLINK.EQ.4) GO TO 21      ITAD0050
 (F1(J.FQ.1.ANDLINK.EQ.2) GO TO 21      ITAD0050
 KK=0      ITAD0050
 GO TO 288      ITAD0050
 22 KK=KK-1      ITAD0050
 21 CONTINUF      ITAD0050
 VIRS=VIR(N)      ITAD0050
 VIR(N)=0.      ITAD0050
 LAMBDAIN(V)=V2S(N)      ITAD0050
 IF(THRUST(N).EQ.0..OR.(R(N).EQ.0..) GO TO 289      ITAD0050
 CT=THRUST(N)*RTRP(N)      ITAD0050
 CALL WIND (N.EXIT)      ITAD0050
 (FEXIT.NE.0.) RETURN      ITAD0050
 289 CONTINUF      ITAD0050
 DVIR=VIR(N)-VIRS      ITAD0050
 IF(ABS(DVIR).GT.|FVIND| VIR(N)=VIR(N)+SIGN(FV(ND,OVIR)
 VIR(N) = .5*(VIR(N) + VIRS)      ITAD0050
 288 CONTINUE      ITAD0050
 XY= SORT(V(4+VIR(N)**2)-V12      ITAD0050
 XY= SORT(AMAX1(0.,XY))*DCAFXK*VIR(N)
 (TER=-1      ITAD0050
 15 VITER=NITER+1      ITAD0050
 ITER=ITER+1      ITAD0050
 (FI(ITER.FQ.4) ITFR=0      ITAD0050
 (FLITM.EQ.0) GO TO 204      ITAD0050
 NDAI=0      ITAD0050
 IF(XL(M,LT,XLIMIN(ND)) XLIM=XLIMIN(ND)      ITAD0050
 EPDD=.5*XLM      ITAD0050
 FPDDR=1./EPDD      ITAD0050
 GO TO 25      ITAD0050
 204 NDAI=3      ITAD0050
 25 NDAI=NDAI+1      ITAD0050
 (F1(LINK.EQ.4) GU TO 26      ITAD0050
 TANAI=TAN(AI)      ITAD0050C
 TANB1=TAN(B1)      ITAD0050C
 COSB1=COS(B1)      ITAD0050C
 PFAC=APDBS/((COS(A1))**2*COSR1)*PSD(N)*TANB1      ITAD0100
 RFAC=ARDSS/COSB1**2-PSD(N)*TANAI      ITAD0100
 (F1(LINK.EQ.3) GO TN 26      ITAD0100
 BETAO(N)=BETAZ(N)+BETAE(N)      ITAD0100
 TZR(N)=TZRN+BETAE(N)*PCC(N)      ITAD0100
 26 CONTINUE      ITAD0100C
 XMAIN(N)=0.      ITAD0100C

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XMB(N)=0.
PMIN(N)=0.
RMDM(N)=0.
THROUE(N)=0.
HFORCE(N)=0.
YFORCF(N)=0.
CALL DOROT(N)
IF EXIT.NE.0.) RETURN
THRUST(N)=THRUST(N)*BNPSI(N)
TORQUE(N)=TORQUE(N)*BNPSI(N)
HFORCE(N)=HFORCE(N)*BNPSI(N)
YFORCF(N)=YFORCE(N)*BNPSI(N)
XMA(N)=XMA(N)-AIBP(N)
XMB(N)=XMB(N)+AIBR(N)
IF(ICOND2.EQ.C.) GO TO 60
DO 59 K=1,12
DO 58 L=1,5
IF(L.EQ.4) GO TO 58
AAIK(L)=AAIK(L)*BNPSI(N)
58 CONTINUE
59 CONTINUE
WRITE (6,106) ((HEAD2)N,K),N=1,4),(AA)N,K),N=1,12),K=1,5)
60 CONTINUE
IF(ICOND1.LT.1.5) GO TO 67
A1DEG=A1*DTRR
B1DEG=B1*DTRR
WRITE (6,104) N,NOA1,A1DEG,BIOFG,XMAIN(N),XMAIN(N)
,PMOM(N),RMOM(N),AIP(N),AIBR(N)
67 GO TO (64,61,62,1),NOA1
64 BASEA=XMAIN(N)
BASEB=XMB(N)
1 IF(ABS(XMAIN(N)).LE.FR(X(N)) AND,ARS) XMB(N)).LE.FR(X(N)) XLM=EPDN
1 IF(ARS(XMAIN(N)).GT.ER(N)) GO TO 66
1 IF(ARS(XMB(N)).GT.ER(N)) GO TO 66
KBAL=1
GO TO 1
66 CONTINUE
IF(ITER.GT.0) GO TO 68
68 A1=A1+EP00
GO TO 25
61 A1=A1-EP00
R1=B1+EP00
PDA=(XMA(N))-BASEA)*EP00R
PDR=(XMB(N))-BASEB)*EP00R
62 B1=B1-EP00
>DAB=(XMA(N))-BASEA)*EP00R
PDB=(XMB(N))-BASEB)*EP00R
DENOM=PDA*A*PDR-PDB*B*POBA
68 CONTINUE
XNA=BASEB*POAB-BASEA*PDBB
XNB=BASEA*POBA-BASEB*POBA
A=999.

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```

1 IF(DENOM.EQ.0.) GO TO 70
2 DAI=XMA/DENOM
3 DB1=XMB/DENOM
4 IF(ICONDI.GE.1.5) WRITE 16,1751 PDA,PDAB,PD6B,DENOM,XMA,XMB.
5
6 A=ARS(DAI)
7 BB=ABS(DB1)
8 IF(A.LT.XLIM.AND.BB.LT.XLIM) GO TO 65
9 IF(A.GT.PI.OR.BB.GT.PI) GO TO 7C
10 DAI=DAI*.5
11 DB1=DB1*.5
12 GO TO 63
13
14 A1=A1+DAI
15 B1=B1+DB1
16 KK=2
17 IF(NITER.LT.ITM) GO TO 15
18 IF(KBAL.EQ.0) GO TO 70
19 KBAL=2
20 NDAI=3
21 GO TO 25
22
23 JJ=1
24 IF(A.LT.XLIM.AND.BB.LT.XLIM) JJ=2
25 WRITE 16,1011 READ(N),(MFAD11,JJ1,J=1,11)
26 EXIT=1.
27 RETURN
28
29 1 IF(KBAL.NE.2) GO TO 4
30 K=J-1
31 WRITE 16,1021 K
32 GO TO 3
33
34 CONTINUE
35 IF(KK.EQ.0) GO TO 2
36 IF(LLNK.LT.4) GO TO 22
37 2 IF(ITM.EQ.0) GO TO 3
38 IF(ABS(XMA(N)).GT.ERR(N)).OR.ABS(XMB(N)).GT.ERR(N)) GO TO 297
39
40 CONTINUE
41 TZRN=TZRN
42 RETURN
43
44 101 FORMAT (1HO,12A4)
45 102 FORMAT 1'CWARNING. THE PARTIAL DERIVATIVE MATRIX MAY BE IN ERROR. 1
46 104 FORMAT (1HO,215,6G15.7/(11X,6G15.7/))
47 105 FORMAT 1HO,8G15.7
48 106 FORMAT (1HO,57X,4A4//6E20,5/6E20,5)
49
50 END

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SUBROUTINE IVAP (EXIT,LINK,TAXL,TAXP,PILGM2,A14,A1M,A1TA,A1TR)
COMMON /STRIM/ AY,VH,AGM,DT1(2),DT2(2),IXZ,
                 OMR,XKD,YVD,ZZD,ALGF,APFP,AYFP,
                 CGWL,CCLL(6),CYRF(4),CYCL(3),
                 DIST,KCIT(20),PFDAT(3),QMAX,
                 QMPS,TIME,TMAX,XCIT(20),61,ALGEI,
                 ALGEI,ALGF2,CGSTA,CWMIC,DIX12,
                 DIX1X,DIZ1Y,DT2MT,DT2MI,FTRTS,
                 HUGKMI(2,2),HURKI(2,2),
                 KPFAD,PIU30,TSTAR(14),2MAX2,2MAX3,
                 ASFCOL,CYPWIC,GEFARAT,PS0552,
                 PS1STP,QXRPBK,RUDIND,ZNELT1,ZNELT2,
                 ZZ,VXS(2),VYS(2),V2S(2),BETA(12,2),
                 T,PCC(12),COSFE(7,7,2),RETAN(2),RETAX(2),
                 RETALL(2),
                 AIR(12),ADD,APDN,AYD),AIR(2),
                 CPSI(12,2),DTPR,PSI(2),Z2TH,
                 RETAD(12,2),BNPSI(2),
                 CMAX2,CMAXV,RATE1, RATE2,STOP2,
                 TRON(2),TRIND,XGUST,RETAD(12),CMAXV1,
                 CMAXV2,(CMAXV1,GUSTP,RETAD(12),CMAXV1,
                 HURKPS,HURKRS,HURTPS,MURTRS,
                 KONFTG,LENGTH1,PILGM1,PSIREF(2),
                 START2,XCOML1(12,2),
                 GM,GRTR,GRW,GRTR,TIM,TITI,
                 T2MT,T2TY,TMT,TYT,XMAJ,XMAIL,
                 XMAIL,XMAILT,AIRPM,AIRPT,AIRRM,AIRRT,
                 APTR,APTT,ACT,APTT,PSD,PSNT,
                 XSTAHM,XSTAH1,XSTAHM,XSTAHM,
                 HURKP,HURKTP,HURKR,HURKTR
                 *AZETA,AZETAT,V7FTA,VZFTAT
                 DATA DTR,HALFP,P1,TNPL / .1745,29E-3 /,1.570796,3.1415916,2.83195 /
                 DEFL,LENGTH1,LENGTH2
                 DIMENSION HURK(2,2),TAX(2),PSIN(2)
                 EQUIVALENCE (HURK(1,1),HURKPI),(PSIN(1),PS0)
                 XNRL(1,M(X1,X2,X3)=AMAX1((X1,AMIN1(X2,X3)))
                 TAX(1)=TAXL
                 TAX(2)=TAXR
                 XNRL(1)=1,KQFAD
                 J=KCIT(1)
                 IF(J.LT.1.OR.J.GT.31) GO TO 201
                 IF(J.EQ.0,1) GO TO 201
                 IF(J.EQ.13) GO TO 200
                 IF(J.EQ.14) GO TO 210
                 IF(J.EQ.21) GO TO 210
                 IF(J.EQ.22) GO TO 210
                 GO TO 220
201   PRINT (6,100) J,(XCIT(L,K),K=1,L)
                 IF(J.GT.8) GO TO 221
                 GO TO (21,232,23,234,226,236,237,2361),J
201   DA=100,CCLL(1)
                 GO TO 230
230   DA=100,CYCF(1)
                 GO TO 270

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233 DA=100./CYCL(1)
 GO TO 239
234 DA=100.*PFEDA(1)
 GO TO 239
236 EA=DTR
 GO TO 239
237 DA=1./PIU30
239 XCIT(L,2)=XCIT(L,2)*DA
 XCIT(L,5)=XCIT(L,5)*DA
 IF(XCIT(L,3)*EQ.0.) GO TO 220
 IF(XCIT(L,4)*GE.XCIT(L,3).AND.XCIT(L,6)*GE.XCIT(L,4)) GO TO 220
 XCIT(L,4)=9999.
 XCIT(L,6)=9999.
 GO TO 220
221 IF(J.GT.12) GO TO 222
 XGUST=XCIT(L,1)
 GMAXV1=XCIT(L,2)
 LNGTH1=XCIT(L,3)
 START?=XCIT(L,4)+LNGTH1
 LNGTH2=XCIT(L,5)
 GMAXV2=XCIT(L,6)
 STOP2=START2+LNGTH2
 IF(J.EQ.10.OR.J.EQ.12) GO TO 223
 RATE1=0.
 IF(LNGTH1.NE.0.) RATE1=GMAXV1/LNGTH1
 RATE2=0.
 IF(LNGTH2.NE.0.) RATE2=GMAXV2/LNGTH2
 GMAXV3=GMAXV1+GMAXV2
 GMAXV3=GMAXV1-START2*RATE2
 GO TO 224
223 PILGH1=0.
 IF(LNGTH1.NE.0.) PILGH1=PI/LNGTH1
 PILGH2=0.
 IF(LNGTH2.NE.0.) PILGH2=PI/LNGTH2
 GO TO 224
222 K=J-12
 GO TO (220+220*211+212*213+214*215+216*220+220*280+220*220,220,
1, 211*282*283*284*286),K
209 XCIT(L,6)=XCIT(L,2)*OMR
 GO TO 220
210 INDIC=XCIT(L,2)+.01
 IF(INDIC.NE.2) GO TO 220
 INDIC=XCIT(L,6)+.01
 IF(INDIC.LT.1.OR.INDIC.GT.2) GO TO 2013
 XCIT(L,5)=TAX(INDIC)
 XCIT(L,2)=1.
 GO TO 220
211 XCIT(L,2)=XCIT(L,2)*DTR
 XCIT(L,3)=XCIT(L,3)/PFDA(3)
 XCIT(L,4)=XCIT(L,4)/PFDA(3)
 GO TO 220
212 IF(XCIT(L,2)*EQ.0.) XCIT(L,2)=9999.
 XCIT(L,5)=0.
 IF(XCIT(L,4).NE.0.) XCIT(L,5)=XCIT(L,3)/XCIT(L,4)

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GO TO 220
211 XCIT(L,2)=XCIT(L,2)*DTR
    XCIT(L,5)=XCIT(L,5)*DTR
    XCIT(L,4)=HALFPI*(HALFPI-XCIT(L,5))
    XCIT(L,6)=-XCIT(L,6)*XCIT(L,4)/PIU30
    GO TO 220
214 CONTINUE
    XCIT(L,2)=XCIT(L,2)/PIU30
    PSISTP=XCIT(L,3)*DTR
    OXERAK=XCIT(L,1)
    GO TO 220
215 CONTINUE
    XCIT(L,2)=XCIT(L,2)/CYCF(3)
    XCIT(L,3)=XCIT(L,3)/CYCF(3)
    XCIT(L,4)=XCIT(L,4)/CYCF(3)
    XCIT(L,5)=XCIT(L,5)*DTR
    GO TO 220
217 CONTINUE
    XCIT(L,4)=XCIT(L,4)*DTR
    XCIT(L,5)=XCIT(L,5)*DTR
    GO TO 211
218 CONTINUE
    IF(XCIT(L,6).EQ.0.) GO TO 217
    XCIT(L,4)=R/M
    XCIT(L,5)=R/M
    GO TO 211
219 CONTINUE
    IF(XCIT(L,6).EQ.0.) GO TO 217
    XCIT(L,4)=B1TR
    XCIT(L,5)=B1TR
    GO TO 211
216 XCIT(L,2)=XCIT(L,2)*TWOPI
    XCIT(L,3)=XCIT(L,3)*XCIT(L,2)
    K=XCIT(L,5)+1
    IF(K.LT.1.OR.K.GT.5) GO TO 201
    GO TO 271,273,274,275),K
280 CONTINUE
    N=XCIT(L,1)+1
    HUBKM(1,N)=1.E+20
    HUBKM(2,N)=1.E+20
    XCIT(L,3)=XCIT(L,3)/PIU30
    DRPM=XCIT(L,4)/PIU30-XCIT(L,3)
    XCIT(L,2)=XCIT(L,2)*DRPM
    IF(DRPM.EQ.0.) GO TO 281
    -HUBKM(1,N)=(HUBKM(N,1)-XCIT(L,2))/DRPM
    HUBKM(2,N)=(HUBKM(N,2)-XCIT(L,2))/DRPM
281 CONTINUE
    HUBKM(1,N)=XCIT(L,2)-HUBKM(1,N)*XCIT(L,3)
    HUBKM(2,N)=XCIT(L,2)-HUBKM(2,N)*XCIT(L,3)
    XCIT(L,3)=HUBKM(N,1)
    XCIT(L,4)=HUBKM(N,2)
    HUBKM(N,1)=XDELM(XCIT(L,3),XCIT(L,2),
1 HUBKM(N,2)=XDELM(XCIT(L,3),XCIT(L,2)),
    HUBKM(1,N)*PSID(N)*HUBKM(1,N))
    GO TO 197

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1 GO TO 220
HUNK#12.MJOPSID(MJ+HUNK#112.MJ)
282 CONTINUE
N=XCITIL,1)*.1
XCITIL,5)=1.E+20
XCITIL,3)=XCITIL,31/PIU30
PIU30=XCITIL,4)/PIU30-XCITIL,3)
XCITIL,2)=XCITIL,2)*DTA
IF(DRPM.NE.0.) XCITIL,5)=(BETAN(NI)-XCITIL,211)/DRPM
XCITIL,4)=XCITIL,2)-XCITIL,5)*XCITIL,3)
XCITIL,3)=BETAN(NI)
XCITIL,6)=0.
GO TO 220
283 CONTINUE
IFI(XCITIL,5),LF,0..OR.XCITIL,5).GT.IS,1 XCITIL,5)*IS,5
XCITIL,6)=0.
GO TO 220
284 CONTINUE
DO 285 K=3,5
XCITIL,K)=XCITIL,K)*DTA
285 CONTINUE
IFI(XCITIL,6),LT,5) XCITIL,6)=.5
XCITIL,6)=XCITIL,6)*DTA
GO TO 220
286 CONTINUE
IFI(XCITIL,3),LE,XCITIL,1)) XCITIL,3)=9999.
IFI(XCITIL,5),LE,XCITIL,3)) XCITIL,5)=99999.
GO TO 220
271 CONTINUE
XCITIL,3)=XCITIL,3)*100./COLL(1)
GO TO 220
272 XCITIL,3)=XCITIL,3)*100./CYCF11
GO TO 220
273 XCITIL,3)=XCITIL,3)*100./CYCL11
GO TO 220
274 XCITIL,3)=XCITIL,3)*100./PEDA11
GO TO 220
275 CONTINUE
XCITIL,3)=XCITIL,3)*DTA
220 CONTINUE
RETURN
2013 WRITE (6,20141 L,J
EXIT=1.
RETURN
108 FORMAT (1H *25X*110*6FI0,3)
2014 FORMAT (1H0,*CHECK PART 2 DATA CARD *12,0 J CODE IS *121
END

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198

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SUBROUTINE JACOBI
COMMON /STRIAR/ D((21))•DT((21))•F((79))•F((10))•X((10)).
D(L,DN,DK,DY,NZ,JX,IV,IZ,PN((10,11)).
DTR•FPD•ERR((10))•KMI•WMN.
R12•SPD(6•6•3)•XBM((21))•XEL((14)).
XFR((7))•XFC((28))•XFM((7))•XFS((35)).
XGM((7))•XTT((21))•XMR((49))•XTR((49)).
XWG((21))•YMR((21))•YTR((21))•YWG((21)).
YEL((21))•YFN((21))•BLCG•DAMP•DEPO((19)).
EPDS•FDPX((1))•MASS•QSVL•TMAS•TTAS,
WLCC•XCON((63))•XJET((14))•XMIN•AYEF.P.
RETAES((2))•CHPCD•DMDO•DYDR•GUESS.
NPASS•ONPH((12•11))•STAGC•TZER.
XMASI•WADAO•DONCOL•DTRSO•NYBODA,
ENG((9))•XPASS•PSD30P•TRINDI•XLIMI
1 V•IND•NMAG•APM•LABMT•AYMT•RETAO((2))•TDEL.T.
PETAE((2))•HGISTE•HGUSTF•MGUSTW•YCUSTF.
2 VGUSTW•YGUSTF•GFMD•GLAT•GVERT.
VTB•VZB•APD•VYR•ARD•AYD.
COLSTK•CYSTK1•CYSTK2•PEDAL•AYE.
APE ARE AIM•AIM•APT•ALTR.
3 YAR((2))•YAR((2))•ZAR((2)).
4 VIMR•VITR•ZFTA•ZFTATR•HMR•HTR.
5 TMR•TR•OMX•OTR•YMRF•STRF.
6 COMMON /STOPLOT/ AH((3))•AL((3))•EXIT•ICCM((49))•IPSN•
NPART•NVARA•NVARC•NSCALE
7 COMMON /KVARTR/ KVARI((1))
DIMENSION VAR((11))
EQUivalence (VAR ((1))•COLSTK)
70 55 L=1•KMI
HETA((1))=RETAES((1))
RETAF((2))=RETAES((2))
TMR=TMP5
TTR=TTP5
VAR(KVARI(L))=VAR(KVARI(L))+DEPD(L)
IF(L•GT..1) VAR(KVARI(L-1))=VAR(KVARI(L-1))-DEPD(L-1)
CALL AJACRA
IF(EXIT.NE.0.) RETURN
IF(L•FO..1) NODCOL=(1.5*(OMX+OTR)-QSVL)/DEPD(L)
NO 41 K=1..KMI
50 (K,L)= (F(K)+PD(K,KMI+1))/EPD
55 CONTINUE
VAR(KVAP(KMI))=VAR(KVARI(KMI))-DEPD(KMI)
RETURN
END

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SUBROUTINE LAMODE (Y,QMC,ZFM,SWING)
COMMON /STRIAB/ D(21),DT(21),E(179),F(10),X(10),
DL,DN,DX,DY,DZ,IY,IY,I2,PD(10,11),
OT,R,EPD,ER(10),KMI,RHO,
R12,SPD(6,3),XBM(21),XFL(14),
XFR(7),XFC(28),XFN(17),XFS(35),
XGN(7),XIT(21),XMP(49),XTR(49),
XMG(21),XMR(21),YTR(21),YMG(21),
YEL(21),YFN(21),BLCG,XDAMP,DEPO(10),
YEL(21),YFN(21),BLCG,XDAMP,DEPO(10).

DAMP MUST HAVE ITS NAME CHANGED HERE TO AVOID
CONFLICT WITH COMMON /TRONIC/

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      P      EPDS,EPDX(10),MASS,OSV1,TMAS,TTAS,
      Q      WLCG,XCOM(63),XJFT(14),XMIN,AYFP,
      A      SETAES(2),CMPCD,DMADQ,DYBDR,GUESS,
      B      YPASS,POPNN(10,11),STACG,TZERO,
      C      XMAST,DMADAO,DDCDL,DTRSO,DYBDR,
      D      FNGRPW,MPASS,PSD30P,TRIMD,XLIMIT,
      P      INDEX,STGAIN(6),TSTAR,COELTD,SLOT(13,9),
      Q      DIMENSION PLMODE(6),FLMODE(6),THEFD(6),TIFROM(6),
      A      FANG2(6),R0007(2,3),
      B      DIMENSION UDSL(11,3),HED(2),KS(3),LS(2),
      C      DATA HEAD/, MON-/ ,KS//,6,4/,LS/3,4/
      D      REAL IX, 12,MASS
      COMPLEX R000T
      WRITE (6,56)
      DO 333 J=1,3
      DO 333 I=1,9
      333 SLOT(J,I)=0.0
      DO 406 I=1,4
      PLMONE(I)=0
      FLMONE(I)=0
      THLFD(1)=0
      T2ERON(1)=0
      406 CONTINUE
      TSTAR=SWING/(12.*V)
      SLOT(1,2)=MASS
      SLOT(1,3)=-SPD(4,4,1)
      SLOT(1,5)=-SPN(5,4,1)/V
      SLOT(1,6)=-ZFM/V
      SLOT(1,9)=MASS-SPD(6,4,1)/V
      SLOT(2,3)=-SPD(4,5,1)
      SLOT(2,4)=IX/V
      SLOT(2,5)=-SPD(5,5,1)/V
      SLOT(2,8)=-XFS(11)/V
      SLOT(2,9)=-SPD(6,5,1)/V
      SLOT(1,3)=-SPD(4,6,1)
      SLOT(3,4)=SLNT(2,9)
      SLOT(3,5)=-SPN(5,6,1)/V
      SLOT(3,8)=IZ/V
      SLOT(1,9)=-SPD(6,6,1)/V
      48(TF (4,457) HEND(1)

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1      WRITE 16.5551 1$LOT(1,1).J=(1.91,PD12.31,PD12.41,1$LOT12.J=(1.91,PD12.41,
1      PD16.31,PD16.41,1$LOT13,J=(1.91,PD14.11,PD14.41) 1$LOT12.J=(1.91,PD12.41),
1      WRITE 16.5571 HEAD121
1      DIV1=2.04M0V
1      ADMD2
1      DIV2=DIV1$MING
1      CALL WDSLOT DIV1, DIV2, TSTAR, PD, SLOT, J, KS, LS, WDSLOT, TSTAR)
1      WRITE 16.5551 WDSLOT
1      WRITE16.7771
1      CALL SRT
1      INDEX=6
1      CALL FLEC 1 GAINB1
1      DO AC7 I=1,NUMRTS
1      IF(UU(1).EQ..0.0,AND,WV(1).EQ..0) GO TN 899
1      IF(VV(1).EQ..0.0,DG1 TO 85)
1      PLMODE(1)=6.2832/ABS(VV(1))
1      PLMODE(1)=1.1/P(MODE(1))
1      IF(UU(1).EQ..0.1 GO TN 899
1      THLFB(1)=.69319/ABS(UU(1))
1      GO TN 807
1      899  (ZEND(1))=1
1      Q07  COMT(MUF
1      DO 465 I=1,NUMRTS
1      IF(12.FAON(1).ME.0) GO TO 465
1      AELP=UU(1)*SLOT(1,2)+SLOT(1,3)
1      ZPRT=VV(1)*SLOT(1,2)
1      Q0001(1,1)=CMPLX(SLOT(1,91,0))
1      ZELP=-I*UU(1)*SLOT(1,91)+SLOT(1,61)
1      ZPRT=-VV(1)*SLOT(1,61)
1      R0001(1,3)=CMPLX(AELP,ZPRT)
1      Q0001(2,1)=CMPLX(Q0001(2,3),0)
1      QELP=UU(1)*SLOT(2,91)+SLOT(2,91)
1      ZPRT=VV(1)*SLOT(2,91)
1      R0001(2,2)=CMPLX(AELP,ZPRT)
1      AFLP=-I*UU(1)*SLOT(2,4)+SLOT(2,51)
1      ZPRT=-I*UU(1)*SLOT(2,4)+SLOT(2,51)
1      R0001(2,3)=CMPLX(AELP,ZPRT)
1      CALL CONSOL (ACMNT,APRT1,APRT2,ZPRT1)
1      ZLNT11=SQRT(APRT1*APRT1+ZPRT1*ZPRT1)
1      IF(APRT1.EQ..0) GO TO 463
1      FANG(1)=57.30ATAN2(ZPRT1,APRT1)
1      GO TN 464
1      463  FANG(1)=90.
1      464  2LMT2(1)= SQRT((APRT2*APRT2)+(ZPRT2*ZPRT2))**2 +(ZPRT2*WV(1))**2 -APRT2*
1      (VV(1))**2/(WV(1))**2+VV(1)**2
1      IF(APRT2.EQ..0) GO TN 464
1      FANG2(1)=57.30ATAN2((ZPRT2*WV(1))-APRT2*WV(1)),(APRT2*WV(1))+2PRT2*WV(1)
1      465  COMT(MUF
1      466  COMT(MUF
1      465  COMT(MUF
1      DO 828 I=1,NUMRTS
1      IF(VV(1))=1.7-01 EN TO 828

```

```

IF(FIZERO(1))-NE.0) GO TO 928
WRITE(6,729)U(1),VV(1),PLMODE(1),FLMODE(1),TMLF08(1),ZLMNT(1),
1,ZLNT2(1),FANG2(1),CNELTD
A28 CONTINUE
      CALL MODE (PD,V,1)
      RETURN
727 FORMAT (1M0,5X,'CONTROLS FIXED',/7X,'R 0 0 1 S',.46X,
1I17'RULL ANG.',.8X,'YAW ANG./RULL ANG.',.5X,'REAL',.8X,'IMAG.',.8X,
2'100',.5X,'FREQUENCY',.9X,'HALF-DRL',.6X,'MAGN.',.9X,'PHASE',.7X,'MAGN.',.8X,
3,.8X,'PHASE',.5X,'LEAD COEF.',.1)
556 FORMAT (1M1,.60X,'LATERAL MODE')
557 FORMAT (1M0,.30X,A4,
1      'DIMENSIONAL COEFFICIENTS OF CHARACTERISTIC EQUATIONS'
2      '/ BFTAS=0> BFTAS=.6X, *BFTA=.9X, *PHI-S=02 PHI-S=.',
3      '9X, *PHI-AX=.AX, *R-S=02, .6X, *R-S=.1X, *R=.7X,
4      'LAT CYCLIC PEDAL')
558 FORMAT (1M,.C10C.2,10G12.5)
      END

```

```

SIGNATURE(NE LINEDE (V. QMG. XFW. ZFM.CWING.XAFL),
  /STRAINS/ DL.DN.DX.DY.DZ.IX.IV.12.PDN(1n,11),
  RTR.FPD.EQR(1n).RML.RMN,
  R12.SDN(6.6.3).XAL(21).XEL(14),
  XER(7).XFC(12n).XFN(7).XFS(35),
  XGN(7).XTT(21).XMR(4n).XTR(49),
  XMG(21).YMP(21).YTP(21).YAG(21),
  YEL(21).YEN(21).YLN(21).YLG.XDAMP.NEPDI(10),
  YMD00090
  YMD00100
  YMD00110
  YMD00120
  YMD00130
  YMD0014n
  YMD00150
  YMD00160
  YMD00170
  YMD00180
  YMD00190
  YMD00200
  YMD00210
  YMD00220
  YMD00230
  YMD00240
  YMD00250
  YMD00260
  YMD00270
  YMD00280
  YMD00290
  YMD00300
  YMD00310
  YMD00320
  YMD00330
  YMD00340
  YMD00350
  YMD00360
  YMD00370
  YMD00380
  YMD00390
  YMD00400
  YMD00410
  YMD00420
  YMD00430
  YMD00440
  YMD00450
  YMD00460
  YMD00470
  YMD00480
  YMD00490
  YMD00500
  YMD00510
  YMD00520
  YMD00530
  YMD00540

DAMP MUST HAVE ITS NAME CHANGED HERE TO AV010
C.INFLICT WITH COMMON /TRONICS/
EPOS.EPDX(10).MASS.OSVI.TMRS.TTRS,
  MLCG.XCTN(63).XJET(14).XMIN.AVEFP,
  XFTAFS(2).CNPCN.DMADQ.DYADQ.GUESS,
  XPASS.PDPH(1n).111.STACG.TZFRD,
  XMAST.DMADAQ.JDANCOL.DTRRSQ.DYBDBR,
  ENGRPM.QXPASS.QXRNQ.TRNQD.LXLIMIT
  J.W.1TM.VHS(2).LINK.QELE.YRT(2),
  VSND.YFIN(2).ZFEEL(2).AIBAL(2),
  AIBAL(2).COND1.SWING.PILGH?._PMGELL1,
  BM+ATR.PHOAT.QMOMM.BMDMT
  U(16).V(6).TAU(22).DAMP(22).NUMRTS.GAINR,
  INNEV.RGAIN(6).TSTAR.CDELT0.SLOT(3,9),
  2.FAL IV.MASS
  PIMFNSION PLIMODE(6).FLMNODE(6).THLFDB(6).IZERDN(6),
  FANG(2).R0000(2.3),
  DTMCHCION.JNSLDT(11.3).HEAND(7).KS(3).LS(2)
  DATA HEAD/*      NON-*/.KS/1.3.5/.LS?/.1/
  .COMPLEX ROOTNT
  WRITF(6.556)
  DN 794 1=1.4
  PLRC(1)=0
  FLNG(1)=0
  THLFB(1)=0
  IZFPN(1)=0
  CONTNUF
  TSTAR=CWING/(2.0V)
  SLT(1.2)= MASS
  SLT(1.3)=--SPN(1.1.1)
  SLT(1.6)=--SPD(2.1.1)
  SLT(1.8)=--SPD(3.1.1),
  SLT(1.9)=2FW/W
  SLT(2.3)=--SPD(2.2.1)
  ZADF=YFL(17)*QFLE*XAELE*YNG(17)*PAGELL1*YNG(18)*YEL(18)*DTRRSQ/
  ((3.+YNG(19))*(3.+YEL(18))@((1.-((YVSND)**2))
  SLT(2.5)=MASS-CZADE
  SLT(2.6)=--MASS+SPD(3.2.1)/V

```

SLOT(2,2)=-XFM/V
 SLOT(3,3)=SP0(1,3,1)
 SLOT(3,5)=CADEOXAELF
 SLOT(1,6)=SP0(2,1,1)
 SLOT(3,7)=1.Y/W
 SLOT(3,8)=SP0(3,3,1)/V
 UNITF(6,597) MEAO(1,1)
 UNITF(6,595) (SLOT(1,1,J=1,9),P0(1,2),P0(1,1,J=1,9),(SLOT(2,J=1,9),P0(5,1))
 WRITE(6,557) MEAO(2)
 DIV2=2.0MG/EV
 DIV1=DIV2*CNING
 CALL MSL010IV1.0IV2.TSTAR.P0,SLOT,3,KS,1,S,UMSL0101,1
 WRITE(6,727)
 CALL SRT
 INDEX=6
 CALL ELEC (CAL101)
 DO 707 I=1,NMETS
 IF(UU(1),EQ,0.0)UU(1)=0.0
 IF(VV(1),EQ,0.0)V(1)=0.0
 IF(WW(1),EQ,0.0)W(1)=0.0
 PMSDE(1)=6.282/ABSI(WW(1))
 FLCONFI(1)=1./PMODEL(1)
 751 IF(UU(1),EQ,0.0) GO TO 799
 FMLFOR(1)=.9995/ABSI(WW(1))
 GO TO 707
 799 IZERON(1)=1
 707 COMT14MF
 DO 365 I=1,NMETS
 IF(IZERON(1),NE,0) GO TO 365
 RNDT(1,1)=CapLx(SLOT(2,31),0)
 PFLP=UU(1)*SLOT(2,51)*SLOT(2,61)
 2PFT=VV(1)*SLOT(2,51)
 2PDT=(PFLP+2PFT)/2PFT
 2SLP=SLOT(2,71)*(VVV(1)+UU(1))*(VV(1)-UU(1))-SLOT(2,81)*UU(1)
 -SLOT(2,91)
 2PFT=(2.00011*UU(1))+SLOT(2,71)*VVV(1)+SLOT(2,81)*UU(1)
 RNDT(1,3)=CapLx(EXELP,2PFT)
 2PDT=(2.00011*UU(1))+SLOT(3,1)*UU(1)
 2FL=SLOT(3,5)*UU(1)+UU(1)
 CAL CONSUL(IPOONT,RPRT1,RPRT1,RPRT2,RPRT2)
 7LN(IPOONT)=SOPRI(IPOONT,RPRT1,RPRT1,RPRT2,RPRT2)
 7LN(IPOONT)=SOPRI(IPOONT,RPRT1,RPRT1,RPRT2,RPRT2)
 1 IF(PPT1,EQ,0.0)GO TO 363
 FANC1(1)=474N27P11.RPPT1/0TP
 161 FANC1(1)=90.
 364 7LM2(1)=SOPRT(RPPT1,2002,119120007)
 1 IF(PPT1,EQ,0.1)GO TO 3645
 FANC2(1)=474N27P11.RPPT1/0TP
 LM000550
 LM000560
 LM000570
 LM000580
 LM000590
 LM000600
 LM000610
 LM000620
 LM000630
 LM000640
 LM000650
 LM000660
 LM000670
 LM000680
 LM000690
 LM000700
 LM000710
 LM000720
 LM000730
 LM000740
 LM000750
 LM000760
 LM000770
 LM000780
 LM000790
 LM000800
 LM000810
 LM000820
 LM000830
 LM000840
 LM000850
 LM000860
 LM000870
 LM000880
 LM000890
 LM000900
 LM000910
 LM000920
 LM000930
 LM000940
 LM000950
 LM000960
 LM000970
 LM000980
 LM000990
 LM001000
 LM001010
 LM001020
 LM001030
 LM001040
 LM001050
 LM001060
 LM001070
 LM001070

```

      GO TO 366
1645 52 7211-FANG1111+90.
166 CONTINUF
365 CONTINUF
    720 720 I=1. NUMATS
    IF(W111.LT.-.C1) GO TO 721
    IF(112FRN11).NE.0IGO TO 72A
    WRITE(6,720) U111,V111,PLMDE111,FLMODE111,TMFLDRC111,ZNT111.
    1 FANG1111,2(LNT211),FANG2111,COELTD
72A CONTINUF
I=?
    CALL MODE (PD,V,1)
    RETURN
727 FORMAT (1HO,5BX,'CONTROLS FIXED',/7X,'R 0 0 7 S 0 .46X,
     1L/TMETA'15X.'ALPHA/TMETA'./5X.'REAL'.'BX.'IMAG'.'BX.'PER IND'.'SX.'FMOD1220
     2REAL/FCY TMHALF-OBL'.'BX.'MAGN'.'BX.'PHASE'.'7X.'MAGN'.'BX.'PHASFLMOD1240
     3.'SX.'LEAN COEF'')
729 FORMAT (1H,10G13.5)
556 FORMAT (1H1.5X,'LONGITUDINAL MODE')
557 FORMAT (1HO,1AX,A4,
     1   'DIMENSIONAL COEFFICIENTS OF CHARACTERISTIC EQUATIONS'
     2   ?   /3X,'U-S--?   U-S'.1IX,'U'.6X,'ALPHA-S'.2
     3   ?   6X,'ALPHA'   THETA-S--?   THETA-S'.7X.'THETA'.'SX
     4   ?   'F/A CYCLIC'   COLLEC.')
555 FORMAT (1H ,G10.2,10G12.5)
END

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SUBROUTINE RANU
COMMON /FORCE/ XF,XFRMG,XFLMG,XFFLE,XFFUS,XFRJET,
1   XFLJET,XFM,XFFIN,XFM,
2   VF,YFFUS,YFJET,YFTR,XFGUN,XFFIN,XFM,
3   YFGUN,YFFIN,YFM,
4   ZF,ZFRMG,ZFELE,ZFFUS,ZFRJET,
5   ZFLJET,ZFAR,ZFLMG,ZFELE,ZFFUS,ZFRJET,
6   GL,LRMG,LIMG,LF,LIF,LIFUS,LBJET,LLJET,
7   LAR,LTR,LGUN,LFIN,LQMR,LOTA,
8   GM,MRMG,MLMG,MLEL,MFUS,MBJET,MLJET,
9   MBR,MTR,MRGUN,MFIN,MQMR,MOTR,
10  QN,NRNG,NLNG,NELE,MFUS,MBJET,MLJET,
11  NBR,NTR,NGUN,MFIN,NQMR,MQMR
12  COMMON /STRINA/ AV,VM,AGM,DT1(12),DT2(12),IX2,
13  QMR,KX0,VV0,ZZ0,ALGF,APP,AVFP,
14  CGML,CGLL(6),CYCF(13),CYCL(3),
15  DIST,KCIT(20),PEDA(31),QMAX,
16  QMRS,TIMF,TMAX,XCIT(20,6),ALCE2,
17  ALGE2,CGSA,CPNC,DIXI2,
18  DIVIX,DIZIV,DTZHY,DTZMI,DTZT1,FTKTS,
19  HUBKMI(2,21),HUKKI(2,21),
20  LREAD,P1U30,TSTAB(14),ZMAX2,ZMAX3,
21  ASECOL,CYPMIC,GEFARAT,PS0550,
22  PS15TP,OXBRAK,RUDIMN,ZDELT1,ZDELT2
23  ML(2),KX,VV,AY1,GO,VPO,OPC,000,
24  QIV,APAC,ARBG,ASEP,AVBG,BMTC,
25  RC,BWTK,BWTM,CBL,DPIX,DP12,
26  FMP1(2),R550,ALEPT,AVDK,DELT2,
27  DPLXZ,DTBNT,DWLCG,MDLT,MCUST,
28  MLTR1,MLTR2,ITORS,KICTR,DMECH,
29  PCDEL,QMPSA,RMASS,TRAL,TWNP1,VGUST,
30  ISTOP,XAGUN,KAPYL,XASPI(2),YAGUN,
31  YARSP1(2),VGUST,7AGUN,ZAPYL,ZARSP1(2),
32  DELT2R,INSTACC,EIMAST,GPRELD,MLPYLD,
33  IBRAKE,DMEGMO,QRAKE,BETAZS(2),
34  PCGDED,PCGMAX,PCRATE,P01DTA,ROELT1,
35  PDELT2,RITORS,YRIND2
36  O,AP,PED,QMG,T2M,11M,T2M,
37  T2T,T1T,T2T,ALEL,CZET,PSDD,
38  SZFT,TAXL,TAXR,XANG,XLMK(16),ZANG,
39  ALCYP,ALFIN,ALLMG,ALRMG,COELE,CDFIN,
40  CDRMG,CDRMG,CLELE,CLFIN,CLLNG,CLRNG,CMING,
41  CYCR1,CYCR2,CZET4,CZET6,CZET9,CRANGE,
42  SZE7,SZET7,SZET8,MCCOL,XAELE,XAFIN,
43  XAFUS,XAJFT,YAFIN,ZAELE,ZAFIN,ZAFUS,
44  YAFLE,YAFUS,YALMG,YARG,YALJFT,YARJET,
45  ZAJET,ALFCRI,ALGFDPD,ROTOM,CZET11,
46  CZET12,CZET13,FIZETA,HALFPI,SZET10,
47  KAPVLD,YGUSTW,ZAPVLD,ZFLWGL,ZFRWGL
48  ,T2MS,T1MS,T2MS,T2TS,T1TS,T2TS,
49  CLOCK,FLOCK,XLOCK,TCLOCK
50  ZZ,VXS1(2),VVS1(2),VZS1(2),BETA1(2),BETA2(2),
51  T,PCC1(7),CSE1(7),BTAM(2),BETAK(2),BETAZ(2),
52  AI9(2),APDD,ARDN,AYDD,AIR(2),
53  COMMON /ROMAN/
54

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1 DPS(112,2),DTRR,NPS(1,2),22TR.
 2 GETAD(12,2),ANPS(1,2).
 3 CND02,CMAXV,RATF1,RATE2,STOP2,
 THEOT(2),TRIND,XGUST,BETA20(2),CMAXV1,
 CMXXV2,CMAXV3,GUSTYP,HNPSSR(2),
 TUBKPS,MUBKRS,MUBTPS,MUBTRS,
 KONFIG,LNGTH1,PILGM1,PSIREF(2),
 START2,XMOML(12,2),
 RM,RTA,DRN,ORTA,TIMI,TITI,
 T2MT,T2TT,T2MT,XMA1,XMA1T,
 XM61,XMA1T,AIBPM,AIBPT,AIRFM,AIBRT,
 APTD,APTD,ARTD,ARTD,PSD,PSDT,
 XSTAMM,XSTAMM,YSTAMM,YSTAMM,
 MUBKPK,MUBKTP,MUBKR,MUBKTR
 *AZETA,AZETAT,YZETA,YZETAT
 1 V,IND,INAG,APRM,ARBM,AYBT,AYBT,AYBT,
 RETAE(2),MGUSTE,MGUSTF,MGUSTW,MGUSTE,
 MGUSTW,YGUSTE,YGUSTF,YGUSTW,YGUSTE,
 COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
 VXB,VPB,APD,VVB,ARD,AYD,
 APE,ARE,AIM,BIM,ALT,BITR,
 XAR(2),YAR(2),ZAR(2),
 VIMR,VITR,ZETA,ZETATR,HMR,HTR,
 THB,TTR,OMK,QTR,YMF,YTRF
 8 COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICON(49),IPSN,
 NPART,MVARA,MVARB,MVARC,MSCALE
 *MVARA,MPRINT,NTIME
 COMMON /FORV/ Y(6,15),O(6,2)
 COMMON /STANAN/ J,W,ITM,VHS(12),LINK
 DATA FOURPI/12.56637/,
 PEAL LP,
 MP,IXZ,ITORS
 DIMENSION A(266),PSID(2),FLAPI(2,2),MUBKS(2,2),MUBK(2,2),
 1 ADR(2),APD(2),
 1 EQUIVALENCE (A(1),Y(1,1)),(PSID(1),PSD),(FLAP(1,1),AIM),
 1 (AOD(1),ARTD),(APORT(1),APTD)
 2 *(MUBKS(1,1),MUBKPS),(MUBK(1,1),MUBKP)
 2 MELIM(X1,X2,X3)-AMAX(X1,XMIN(X2,X3))

PART 3. ELEVEN DEGREE OF FREEDOM MANEUVER SECTION
 SYMBOL IDENTIFICATION
 1 V1, 1) VXB X-COMPONENT
 2 V1, 2) VYB Y-COMPONENT
 3 V1, 3) VZB Z-COMPONENT
 4 V1, 4) AVD YAW-COMPONENT
 5 V1, 5) APD PITCH-COMPONENT
 6 V1, 6) ARD ROLL-COMPONENT
 7 V1, 7) PSD RPM-COMPONENT
 8 V1, 8) AYE EULER ANGLE
 9 V1, 9) APE EULER ANGLE
 10 V1, 10) ARE ROLL ANGLE
 11 V1, 11) DTR DELTA T2M FROM BOOM
 12 V1, 12) DTANT DISP
 13 V1, 13) DTBUTO DELTA T2M FROM BOOM
 14 V1, 14) DTBUTD VFL
 BODY REFERENCE
 ANDY REFERENCE
 BODY REFERENCE
 TPP REFERENCE
 FIXED TO BODY
 FIXED TO BODY
 FIXED TO BODY
 ROTOR REFERENCE
 ROTOR REFERENCE
 ROTOR REFERENCE
 MANU0970
 MANU0980
 MANU0990
 MANU1000
 MANU1010
 MANU1020
 MANU1030
 MANU1040
 MANU1050
 MANU1060
 MANU1070
 MANU1080

SOCIOLOGIE - KULTUR

レッスンで、日本語の発音練習をする。日本語の発音は、英語の発音と大きく異なるので、特に注意が必要だ。

WANU2426
WANU2425
WANU2424
WANU2423
WANU2422
WANU2421
WANU2420
WANU2419
WANU2418
WANU2417
WANU2416
WANU2415
WANU2414
WANU2413
WANU2412
WANU2411
WANU2410
WANU2409
WANU2408
WANU2407
WANU2406
WANU2405
WANU2404
WANU2403
WANU2402
WANU2401
WANU2400

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112 *Journal of Health Politics*

2012 • N1 = 251 affecti

ANNUAL REPORT OF THE BOARD OF EDUCATION OF THE STATE OF MARYLAND FOR THE YEAR 1870-71.

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C2-A0571A2D0/1C0510E1A211002

ELAPSI. M. - ATANAYANA - 1

TANIMOTO-SIMILARITY

2009 CONTINUUM

MADU2170

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    DELT2=RDLET
    JIAND1=RDELT1
    30 TR 420
    400 DELT2=TDELT1
    QUANI=RDELT2
    420 20 44.7 K=1.75
    Y(1,K)=Y(1,K)+Y(1,-(K+75))*DELT2
    440 CONTINUF
    450 VX9=Y(1,1)
    VVB=Y(1,2)
    VZB=Y(1,3)
    AYD=Y(1,4)
    APD=Y(1,5)
    APD=Y(1,6)
    PS19FF(1)=Y(1,7)
    PS1REF(1)=Y(1,8)
    PSD=Y(1,9)
    PSD=PSNAGFARAT
    AVE=Y(1,10)
    APE=Y(1,11)
    ASE=Y(1,12)
    IF(Y(1,1),LT,0.) Y(1,13)=C.
    DTBW=Y(1,13)
    XX=Y(1,15)
    YY=Y(1,16)
    ZZ=Y(1,17)
    NO 214 N=1,2
    YPSIN=NPSIN(N)
    IF(NPSIN.F0.,0.) GO TO 214
    NO 213 K=1,NPSIN
    RETAIK=N) Y(1,7+4*K+10)
    RETADIK,N) Y(1,7+4*K+24)
    213 CONTINUF
    214 CONTINUF
    PSDSS=PSSNERSSC
    CALL PATS(VXB,VYA,VZB,AVE,APE,ARE,XXD,YV0,ZZD,1)
    VHSO=XXD*2*YYD*2
    VH=SORT(VHMSO)
    VSO=RT(VHMSO+ZZD*2)
    AV=C.
    AVF=0.
    AVF=PA0.
    IF(VX9.NE.0.0.OR.-VVB.NE.0.) AV=ATAN2(-VVB,VXB)
    IF(VH.NE.0.) AVF=ATAN2(VYD,XXD)
    IF(V.NE.0.) APP=ATAN2(-ZZD,VH)
    IF(VARS.NE.0.) RETURN
    IF(I.EQ.3,0R,IND,EQ.1) GO TO 225

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    *** VARIATIONS DUE TO INPUTS ***
    CALL VAPI
    IF(IFXIT.NE.C.) GO TO 1
    CALL SWAS(ICOLSTR)

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```

MANU2710
MANU2720
MANU2730
MANU2740
MANU2750
MANU2760
MANU2770
MANU2780
MANU2790
MANU2800
MANU2810
MANU2820
MANU2830
MANU2840
MANU2850
MANU2860
MANU2870
MANU2880
MANU2890
MANU2900
MANU2910
MANU2920
MANU2930
MANU2940
MANU2950
MANU2960
MANU2970
MANU2980
MANU2990
MANU3000
MANU3010
MANU3020
MANU3030
MANU3040
MANU3050
MANU3060
MANU3070
MANU3080
MANU3090
MANU3100
MANU3110
MANU3120
MANU3130
MANU3140
MANU3150
MANU3160
MANU3170
MANU3180
MANU3190
MANU3200
MANU3210
MANU3220
MANU3230
MANU3240

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T1MT-T1M+DT1(1)
T2MT-T2M+DT2(1)
T1T-T1T+DT1(2)
T2T-T2T+DT2(2)
CALL PCC PSD,0T2MT,1)
DT2=DT2MT+ASECDL
T2M=T2M+DT2M1+DT2
T2T =T2T+DT2T1+DT2ETRIND
    775 URM=PSDEPM
    776 Te=PSDTRTA
    T2MT-T2M +DTBWT
    T2T-T2T +DTBWTETRIND
    777 TR=TRALT-27ETRIND

        CALL ANAL

        IF EXITT.NE.0.J GO TO 1
        QMR=QMX+QTR*GEARAT
        QMR = TORQUE FROM AIRLOAD DRAG
        QMAX = MAXIMUM TORQUE AVAILABLE
        QTRS = TORQUE SUPPLIED
        QMRS = TORQUE AVAILABLE, LIMITED BY ENG. ACCEL. SCHED.

        IF (OPC.EQ.10.) GO TO 315
        IF (Q00.EQ.1.) GO TO 306
        IF (Q00.NE.2.1GO TO 303
        QMRS=QMR
        GO TO 315
304  IF (OMRSA.GE.QMAX) GO TO 308
        IF (G0V.LT.0.0) GO TO 315
        IF (G0V.NE.0.1) GO TO 305
        QMRS=QMAX
        GO TO 308
305  IF (I.EQ.3.DR.IND.EQ.1) GO TO 308
        G0V=TDelta/G0V
        QMRS=QMSA*(SQR(TOMRSA*QMAX))+25*TG0V*QMAX)+TG0V
        IF :OMRSA.GT.QMAX101*QIA01
        306  QMRS=XDELIM((QMSA,OMP$))
        307  CONTINUE
        308  IF (I.EQ.1) GO TO 322
        IF (PSN.FQ.0.1) GO TO 323
        PSSTOP=PSISTP-PSIREFLII
        IF (PSD .LF. (-PSD*TDelta)) GO TO 325
        IF (PSDNP.GF.(PSD*TDelta)) GO TO 321
        309  CONTINUE
        310  OPSTOP=OPSI(2,1)
        IF (ICAN.FQ.1.AND.OPSTOP.GT.OSTOP) GO TO 325
        IF (OPSTOP.LT.0.1 GO TO 320
        311  CONTINUE
        312  OPSTOP=OPSI(2,1)
        IF (ICAN.NF.1.OF.DPSTOP.GE.FNURP1-QMR
        QMR=ICAN.TMSOP*2/(DPSTOP+OPSTOP)-QMR
        IF (ICAN.NF.1.OF.DPSTOP.GE.FNURP1 QMRAKE=AMINI(QBRAKF.QBRAK)
        IF (QBRAKF.GT.QMRAKE) GO TO 327

```

OMP = OMRA + OMRAKE
 IF(DSTOP=0,1,0.45112,1,1.AND.OMRAKE=0,1,1.CAN=1
 IF(ICAN=EQ,1,1,DS101-DS10P+1
 IF(DSTOP=0,1,1,DS101-DS10P+1
 GO TO 322

375 CONTINUE
 DSTOP=PS1STP-PS1REF(11)
 PS1REF(11)=PS1STP
 PS1REF(12)=PS1REF(12)+DSTOP*GEARAT
 70 324 K=1,4
 Y(K,7)=PS1STP
 Y(K,8)=PS1REF(12)
 Y(K,9)=0.
 Y(K,82)=0.
 Y(K,83)=n.
 Y(K,84)=0.
 I STOP=1

324 CONTINUE
 GO TO 323

322 CONTINUE
 Y(1,84)=(OMRS-OMR) * RITORS

323 CONTINUE
 LP=QL - APD(LAPD0121Y-ARD)(XZ)
 NP=ON - APD(LANDE(Y(XZ)-AYD)(XZ)
 Y(1,76)= TFORMASS - APD(Y2) + AYD070
 Y(1,77)= TFORMASS - AYD070 + ARDEV28
 Y(1,78)= TFORMASS - ARD+VBS + APUVB
 AYD01(LPDP12+NPDP1X
 AP00=(OM-AYD*ARD)(XZ)+(V0+ARD)*(AYD-ARD)*(XZ)*RIVY
 ARD0=LPDP12+NPDP1X
 Y(1,79)=AYD0
 Y(1,80)=APD0
 Y(1,81)=ARD0
 Y(1,82)=Y(1,91)
 Y(1,83)=Y(1,91)*GEARAT
 CAP=COS(IAPE)
 SARE=SIN(IAPE)
 CARE=COS(IARE)
 INFAB(CAPE).LT.0.0011 GO TO 1
 Y(1,85)=IAPD*SARE + AYDCARE/CAPE
 Y(1,86)= APDECARE - AYD*SARE
 Y(1,87)=ARD+Y(1,85)*SIN(IAPE)
 Y(1,88)=Y(1,14)
 BWTDD=BTW(GMERT-GPRELO1-BMTDD.GE.0.) GO TO 668
 IF(BWTDD>CT,0.,0.BWTDD.GE.0.) GO TO 668
 Y(1,13)=0.
 Y(1,14)=0.
 Y(1,88)=0.
 Y(1,89)=0.
 BWTDD=0.

668 Y(1,89)=BWTDD
 Y(1,90)= XXD
 Y(1,91)= VYO
 Y(1,92)= ZZO
 PSOP=Y(1,84)

```

DO 671 N=1,2
NPSIN=NPSI(N)
IF(NPSIN.EQ.0) GO TO 671
DO 670 K=1,NPSIN
Y(1,7*N+K+10)=BETAI(K,N)
Y(1,7*N+K+24)=BETAD(K,N)
Y(1,7*N+K+65)=BETAD(K,N)
670 CONTINUE
671 CONTINUE
IF(IND.NE.0) GO TO 500
I=I+1
IF(I.LE.4) GO TO 355
DO 490 I=1,75
K=I+75
Y(4,K)=(Y(1,K)+2.0*(Y(2,K)+Y(3,K))+Y(4,K))*1.666667
490 Y(4,I)=Y(1,I)+TDELT*Y(4,K)
IND=1
I=4
50 TO 450
500 DO 495 I=1,150
495 Y(1,I)=Y(4,I)
T=T+TDELT
IND=0
I=1
GO TO 210
A4=99999999.
1 WRITE (31 IPSN,A4,A
RETURN
END

```

```

SUBROUTINE MATRIX (A1,A2,A3,A,N1)
DIMENSION A(9)
      COMPUTE EULER ANGLE MATRIX A FROM EULER ANGLFS A1,A2,A3
      N1=1 IS FOR USUAL MATRIX
      N1=-1 IS FOR INVERSE OF USUAL MATRIX
SA1=SIN(A1)
SA2=SIN(A2)
SA3=SIN(A3)
CA1=COS(A1)
CA2=COS(A2)
CA3=COS(A3)
S1C3=SA1*CA3
S1S3=SA1*SA3
C1C3=CA1*CA3
C1S3=CA1*SA3
A(1)=CA1*CA2
A(3-N1)=C1S3*SA2-S1C3
A(5-2*N1)=C1C3*SA2+S1S3
A(3+N1)=SA1*CA2
A(5)=S1S3*SA2+C1C3
A(7+N1)=CA2*SA3
A(5+2*N1)=-SA2
A(7-N1)=S1C3*SA2-C1S3
A(9)=CA2*CA3
      RETURN
      END

```

TWO DIMENSIONAL VECTOR TRANSFORMATION
N1=1 IS FOR USUAL
N1=-1 IS FOR INVERSE
SUBROUTINE MICE (X1,Y1,A,X2,Y2,N1)
S=SIN(A)*N1
C=COS(A)
X2=X1*C-Y1*S
Y2=X1*S+Y1*C
RETURN
END

MICE0010
MICE0020
MICE0030
MICE0040
MICE0050
MICE0060
MICE0070
MICE0080
MICE0090
MICE0100

ALCYD•ALFIN•ALWNG•ALWNG•CDELE•COFIN.
 CDEMG•CDNG•CLELE•CLIN•CLNG•CLNG•CWING.
 CYCRI•CYCR2•CZET4•CZET6•CZET9•RANGE.
 SZET5•SZET7•SZETA•MCOL•XAELE•XAFIN.
 XAFUS•XAJET•YAFIN•ZAELE•ZAFIN•ZAFUS.
 YAELE•YAFUS•YALNG•YANJET•YARJET.
 ZAJET•ALECRI•ALEGPN•BOTTOM•CZET11.
 CZET12•CZET13•EIZETA•HALFPI•SZET10.
 XAPVLD•YEGUSTW•ZAPVLD•ZFLWC1•ZFRNG1
 •T245•T1MS•T745•TZTS•T1TS•T2TS•
 CLOCK•FLOCK•XLICK•TCLOCK
 22•VXS(21•VYS(21•V2S(21•BETA12•21•
 T•PCCC621•C0SE(7•7•21•BETA11(21•BETA12(21•
 THROT(2)•TRIND•XGUST•BETAZD(2)•GMARYL.
 GMAXV2•GMAXV3•GUSTUP•MPSIR(2)•
 HURKPS•HURKAS•MUBTPS•MUBTRs.
 KOMFIG•LNGTM1•PILGH1•PSIREF(2)•
 START2•XMOD(112•21•
 RM•QTR•DRN•ORT•TMT•TMT.
 T2MT•T2T1•T2M1•T2T1•XMAI•XMAI.
 XMB1•XMBR1T•AIPM•AIBP•IBPM•IBRT.
 APTD•APTID•ARTD•ARTD•PSD•PSDT.
 XSTAMW•XSTANT•YSTAHM•YSTANT.
 MUBK8•MUBKTP•MUBK8R•MUBKTR
 COMMON /MANARD/ .
 A18(21•APPD•ARDD•ADD•AVIR(2)•
 OS1112•21•01RR•MDSI1121•
 BETAD112•21•BNPSI121•
 CONDU22•GMMAXA•WA131•WA132•STOP2.
 A18(21•APPD•ARDD•ADD•AVIR(2)•
 OS1112•21•01RR•MDSI1121•
 CONDU22•GMMAXA•WA131•WA132•STOP2.
 THROT(2)•TRIND•XGUST•BETAZD(2)•GMARYL.
 GMAXV2•GMAXV3•GUSTUP•MPSIR(2)•
 HURKPS•HURKAS•MUBTPS•MUBTRs.
 KOMFIG•LNGTM1•PILGH1•PSIREF(2)•
 START2•XMOD(112•21•
 RM•QTR•DRN•ORT•TMT•TMT.
 T2MT•T2T1•T2M1•T2T1•XMAI•XMAI.
 XMB1•XMBR1T•AIPM•AIBP•IBPM•IBRT.
 APTD•APTID•ARTD•ARTD•PSD•PSDT.
 XSTAMW•XSTANT•YSTAHM•YSTANT.
 MUBK8•MUBKTP•MUBK8R•MUBKTR
 COMMON /MANARD/ .
 A18(21•APPD•ARDD•ADD•AVIR(2)•
 OS1112•21•01RR•MDSI1121•
 CONDU22•GMMAXA•WA131•WA132•STOP2.
 GMISIM•YEGUSTF•GFMD•GLAT•GWERT.
 VXB•VZB•APD•VVA•APD•AVD.
 CULSTK•CUSTKL•CV<TK>•PEDAL•AVE.
 APE•ARE•AIM•AIM•ALTP•BITR.
 XARI(2)•YARI(2)•ZARI(2)•
 VIMR•VITP•ZFTA•ZFTATR•HMR•HTR.
 TEE•TRR•OMX•OTR•YRF•YTF
 J•W•(TM•VMS(2)•LINK•QFL•VRDT(2)•
 VSND•VF(4(2)•ZFEL(2)•AIRAL(2)•
 R19AL(2)•COND1•SWING•PLGM2•PMGEL1.
 SWK(2)•SMXR2(2)•TIP10(2)•TIP10(2)•
 TWIST(2•2)•CLRADK(2)•DELTA1(2)•
 LAMDA(2)•UPGUST•URGUST•URGUST•URGUST.
 FTM•FTR•ERX4•FXT.
 XLMAXX•XLMAXI•XLMINN•XLMINT
 AM131•AL131•EXIT•ICW4691•IPSN.
 XPART•XVARA•XVARB•XVARC•XSCALE
 •XVAPS•XPRINT•NTMF

COMMON /STARAN/ RH(12),C1,C4,PW,RP,CLR,DCD,DOL,DQ,VIM.
 RAI(2),CLAN,CNAU,ETAQ,QJET.
 OFIN,
 VIFR,FLAC,VFS(14),
 CNBCL,CNPCL,CNPCN,CNACL,CNLKS,DASL,
 FNSMC,LWING,PMHFL,PMHNG,
 PTFN,RPIST,VMAXF,VAERO(31,5).
 APBJT,APBJET,AVAJET,
 CNPCD,CNPCC,COBJET,DWNGEL,DZMGEI,
 ETAGMX,PWGMK1,RCWING,SWINGM,
 VENTER,VMMVER
 4 COMMON /FORY/Y(4,150)
 PEAL IX,IV,12,IX2,MASS,ITORS,ILJFT,ILBJET,ILJET,MRJET,NRJET
 DIMENSION FOR(71)
 EQUIVALENCE (XF,FOR(1))
 NVARD=C
 IFINVARC,NE=2) GN TO 102
 NVARD=1
 NVARC=0
 GN TO 100
 102 CONTINUE
 IFINVARC,NE=0) NVARC=1
 100 CONTINUE
 TRIND?=1,-TRIND
 CALL TINIT(TAIR)
 ALEL=0.
 ALFIN=0.
 ALLWS=0.
 AIRWG=0.
 APPD=0.
 APDD=0.
 APBJET=0.
 ARD=0.
 ARDD=0.
 AYD=0.
 AYDD=0.
 BFTAE(1)=0.
 BFTAE(2)=0.
 BETAR(1)=0.
 BETAR(2)=0.
 CLWIG=0.
 CDRNG=0.
 CDELE=0.
 CDFIN=0.
 CLLNG=0.
 CLWIG=0.
 CLELE=0.
 CLFIN=0.
 DQL=0.
 DON=0.
 ETAQ=0.
 EXIT=0.
 GUSTYPE=0.
 HGUSTE=0.

```

        V-GUSTF=0.
        V-GUSTW=0.
        VMR=0.
        VTR=0.
        IND=1
        VMAG=0
        VSDU=0.
        OMX=0.
        OTB=0.
        SWC(1)=1.
        UPGUSTY=0.
        UGUST=0.
        URGUST=0.
        VGUSTF=0.
        VGUSTW=0.
        VIEP=0.
        VIW=0.
        XMA1=0.
        XMB1=0.
        XMA1T=0.
        XMB1T=C.
        YGUSTF=0.
        YGUSTW=0.
        YMRF=0.
        YTRF=0.
        PSD550=PSD+R550
        DO 307 I=1.71
        FOR(I)=0.
    107 CONTINUE
        DO 308 J=1.150
        DO 308 I=1.4
        YII.J=0.
    108 CONTINUE
        CALL NOPSI1 (NPST1,MNPST1,BNPST1,DPSI1)
        DIZY=IZ-IV
        DIXIZ=IX-IZ
        DIFYX=IV-IX
        SET UP CURVE FOR EFFECT OF MAIN ROTOR WAKE ON THE ELEVATOR.
        THIS CURVE CAN BE REPRESENTED BY TWO STRAIGHT LINES - ZERO
        BEFORE THE VELOCITY IS GREAT ENOUGH TO CAUSE AN EFFECT ON
        THE ELEVATOR. VENTER: A LINE WITH CONSTANT SLOPE FROM VENTER
        TO A VELOCITY WHICH PRODUCES A MAXIMUM EFFECT. VMAXE: AND A
        CONSTANT AT VMAXE AND GREATER.
        VMVER=PMREL
        IF(VMAXF.NE.VENTER) VMVER=PMREL/(VMAXE-VENTER)
        IF(XLMINM.LE.0..OR.XLMINT.GT.DTR1) XLMINM=.3490659E-02
        IF(XLMINM.LE.0..OR.XLMINT.GT.DTR1) XLINT=.3490659E-02
        IF(ERXM.LT.750.) ERXM=750.
        IF(ERXT.LT.750.) ERXT=750.
        XMMAX=8.*XLMINM
        XLMAXT=R.*XLINT
        IF(XMIN.LT.-.8726645E-03) XMIN=0.0
        MNEM1640
        MNEM1650
        MNEM1660
        MNEM1670
        MNEM1680
        MNEM1690
        MNEM1700
        MNEM1710
        MNEM1720
        MNEM1730
        MNEM1740
        MNEM1750
        MNEM1760
        MNEM1770
        MNEM1780
        MNEM1790
        MNEM1800
        MNEM1810
        MNEM1820
        MNEM1830
        MNEM1840
        MNEM1850
        MNEM1860
        MNEM1870
        MNEM1880
        MNEM1890
        MNEM1900
        MNEM1910
        MNEM1920
        MNEM1930
        MNEM1940
        MNEM1950
        MNEM1960
        MNEM1970
        MNEM1980
        MNEM1990
        MNEM2000
        MNEM2010
        MNEM2020
        MNEM2030
        MNEM2040
        MNEM2050
        MNEM2060
        MNEM2070
        MNEM2080
        MNEM2090
        MNEM2100
        MNEM2110
        MNEM2120
        MNEM2130
        MNEM2140
        MNEM2150
        MNEM2160

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IF(XMIN.GT.0.0) XMIN=0.0
IF(XL(MIT,LIT,1.5*0.01).LT.XL(MIT,(GT-1745320)) .LT.0.01) XLIMIT=0.0
IF(DAMP-LI-(1.0*0.01)) DAMP=4.0*0.01
YAR(1)=YARSP(1)
YALMG=-YARMG

YALJET=-YARJET
IF(TRIND.ME.O.=AND.ABS(YARSP(1))-YARSP(1)).LE.5.0 TRIND=1.
KONFIG=1.*TRIND+T*IND1
CALL COM2 (XCON,XLINK,KONFIG,RUD(ND))
RC=0.
IF(XMR(14)=NE.O.) RC=A(111)/W
IF(KONFIG,FU,3) RC=PC*2.*BM
CALL TILT (KONFIG,I)
CALL TILT (XAR,ZAR,CGL,COLL,ZETA,C;STA)
CALL TFEA (XAR,BETAZ,C;STA)
CALL HSAF (XAR,YAR,DPSI,NPSI,CGSTA,PSI,REF)
XAR(2)=YARSP(2)+ML(2)*SIN(ZETATR)
CZTR=COS(ZETATR)
MLTR=ML(2)*TRIND
YAR(2)=YARSP(2)-MLTR2*CZTR
ZAR(2)=ZARSP(2)-MLTR2*CZTR
CALL RATS (XXD,YY),ZZD,AYE,APF,ARE,VXR,VYB,-1)
V=SQRT(XXD*YY*ZZD*YY*ZZD)
CALL TURN (XFC,V,ARE)
MOTOR=1350.*TRIND
RW=1./W
MASS= W/32.17
IF(EPDS.FD.O.) EPDS=.3
ARMING=YWG(1)
IF(ARMING.EQ.0.) ARMING=1.
SWING=SOR(TXWG(1))*ARMING)
CWING=SWING/ARMING
RCWING = 0.
IF(CWING.NE.0.) CWING = 1./CWING
CAGW=COS(AGM)
CWG6=.6*CWING
YAER0(19,3)=YAER0(13,3)/YAER0(17,3)
P1ST=.35*CAGW/(HALFP1-YAER0(19,3))
DXWGL=XANG-XAEL+CWG6*CAGW
DZWGL=ZANG-ZAEL+SIN(AGW)*CWG6
SWINGH=.5*SWING
CNPCD1=CNPCD*YAER0(13,3)
CNPCD2=CNPCD*2.*YAER0(14,3)*ARMING/13.*ARMING
C
C IF THERE ARE NO JETS CALCULATE FORCES AND MOMENTS AND USE THE
C VALUE OF COLJET TO PREVENT FURTHER CALCULATIONS LATER IN THE
C PROGRAM
C
C IF(INJET.EQ.0) COLJET=0.
C CALL PATS(TAXL,0,0,-AYAJET,APBJET,XFLJET,YFLJET,ZFLJET,1) MMEM2600
C CALL DOGS (XAJET,YAJET,ZAJET,XFLJET,YFLJET,ZFLJET,LLJET,MLJET,
C   NLJET)
C   CALL RATS (TAXR,0,0,AYBJET,APBJET,XFRJET,YFRJET,ZFRJET,1) MMEM2640
C   CALL DOGS (XAJET,YAJET,ZAJET,XFRJET,YFRJET,ZFRJET,LRFJET,MRFJET, MMEM2700

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```

1 NRJETI
    AYBMT=ZETATR+TRIND02
    APBMT=-ZETATR+TRIND02
    ARBMT=HALFPI+TRIND02
    ZZTR=TRALI-ZZ+TRIND
    CYCRI=CYSTK1+CYCF(3)+CYCF(2)
    CYCR2=CYSTK2+CYCL(3)+CYCL(2)
    PED+PEDA+PEDA(3)+PEDA(2)
    COLKS=COLSTK
    CALL SMAS (COLSTK)
    IF(GUESS.EQ.2) GO TO 58
    ORIGINATE GUESS FOR THRUST AND FLAPPING.

    XFMG = 0.
    ZFMG = 0.
    IF(XMG.LT.0) GO TO S1
    AP=0.
    IF(VTB.NE.0.0.DR .VIB.NE.0.) AP=ATAN2(VTB.VTB)
    ALMG=AGH+AP
    XMAC=VVSND
    CALL CLCD (ALMG,CL,CD,XMAC,EXIT.3)
    IF(EXIT.NE.0.) RETURN
    CALL MICE ( -CD,-CL,AP,C1,C2,1)
    VONG = 2.evensong
    ZFMG = VONG*AC2
    XFMG = VONG*AC1
    S1 CALL RATS (0.0.0..W.AVE.APE.ARE.XFM.YFM.ZFM.-.1)
    DF=Qeveyel(YFS(7)+1.)+XFMG
    TMR=((ZFM+ZFMG)*C2ET*DfS2ET)+(1.-.5*TRIND)
    TTR=125.*BTR+TRIND02*TMR+TRIND01
    IF(GUESS.NE.-C.-3) GO TO 56
    IF(DRM.GT.RM) GO TO 52
    WRITE(6,53)
    EXIT = 1.
    RETURN
    S2 CONTINUE
    ALFI=APE-APPF
    THTR=TR+TWIST((3*NXR(11)/4.+1))
    ALF=ZETATR+TRIND-ALFI
    XMU=V/DR+ECOS(ALF)
    XL4=V/DR+ SIN(ALF)
    ALMAXU=(2.666667*THTR+2.*XLMI)/(1.0.-.5*XMU+0.2)-TRIND
    ALPM=T2N
    THTR=T2T-TWIST((3*NXR(12)/4.+2))
    ALF=ZETATR+TR-ALFI+TRIND-(Ave-AVFPI)+TRIND
    XMU=V/DR+ECOS(ALF)
    XL4=V/DR+ SIN(ALF)
    ALTR=TR*((2.666667*THTR+2.*XLMI)/(1.0.-.5*XMU+0.2))-TRIND
    ALTR=T2T
    S3 CONTINUE
    VIMR = 0.
    VITR = 0.

```

C C

```

1F1(AM,FO,0,0) TMAX=0.
1F1(ATP,FO,0,0) TTR=0.
1F1(TMR,FO,0,0,OR,TRM,LE,RN) GO TO 50
ALT=-22
CALL RATS (VX8,VRA,VZB,C,-ZETA,0,VX5(1),WVS(1),VZS(1))-1
VROT(1)=V
VHS=VX5(1)*2+VVS(1)*2
ZT=TMP*ATRP(1)
CALL VIND (1,EXIT)
CALL VIND (VX5,VRA,VZB,AVBMT,APBMT,ARBMT,VRS(1),VVS(1),VZS(1))-1
ALT=22TP
CT=TTR*ATRP(2)
CALL VIND (2,EXIT)
50 CONTINUE
Y(1,0)=XMD
Y(1,9)=YDD
Y(1,91)=ZD0
Y(1,92)=ZD0
RAIB(2)=RAIB(2)*GEARAT
1F1(PSh,NE,0,1 GO TO 73
D1 72 N=1,2
BETAN(NI)=BETAZ(INI)
BETAX(INI)=BETAZ(INI)
72 CONTINUE
XFC(73)=2.
A1M=0.
R1M=0.
A1T=0.
91TR=0.
GO TO 67
73 CONTINUE
1F1(XFC(23),NE,1,) GO TO 66
1BRAKE=0
PSD=0.
PSDT=0.
67 CONTINUE
NPST(1)=0
NPST(2)=0
ITM=C
CONTINUE
LINK=1
PSISTP=0.
1F1(INPART,NE,2) GO TO 109
WRITE (6,108)
1F1(INVAR,NE,0) GO TO 103
WRITE (6,104)
GO TO 105
103 WRITE (6,104) IVARR
105 WRITE (6,107) TZERO,ZDELT1,TMAX,ZMAX2,ZMAX3
CALL IVAR (EXIT,LINK,TAR,TAR,PILGM2,A1M,B1M,ALTR,01TR)
109 CONTINUE
1F1(XFC(23),NE,1,) GO TO 65
CALL NPST1 (NPST,MPST,MPST1,DPS1)

```

```

DO 64 N=1,2
  SLEFT(N)=PSISTP
  IF(KONFIG.EQ.3) GO TO 67
  AFTAN(N)=0.
  AETAN(N)=0.
  RFTAX(N)=0.
  IF(N.FO.2) GO TO 64
  DO 61 K=1,12
  DPSI(K,N)=0.
  IRIK.GT.7) GO TO 61
  DO 62 L=1,7
  CSEIK(:,N)=1.
  63 CONTINUEF
  64 CONTINUEF
  65 CONTINUEF
  AFTAN(N)==HALFPI
  BFTAN(N)==HALFPI
  AETAN(N)==HALFPI
  'PSIN=NPSIN)
  DO 63 K=1,NPSIN
  BFTAI(K,N)==HALFPI
  66 CONTINUEF
  67 CONTINUEF
  68 CONTINUEF
  IF(NPART.NE.2) RETURN
  C
  ! INITIALIZE VARIABLES ONLY IF A MANEUVER IS CALLED FOR.
  C
  1 TNS=DAIBIL+DAIB(2)
  IF(TNS.NE.0.) RETURN=L/TNS
  L=WING(2)
  CALL WAG1
  OMASS=L/MASS
  QY=L/IV
  DP = IX*I2 - IX*IX/
  IF(DP.EQ.0.) GO TO 70
  DP1X=IX/DP
  DP1X=IX/DP
  DP17=17/DP
  Y(1,9)=PS1
  Y(1,17)=22
  Y(1,82)=PS2
  Y(1,43)=PS3
  2 RETURN
  70 CONTINUEF
  EXIT=1.
  WRITE (6,71)
  71 FORMAT('A FLAPPING ANGLES CANNOT BE ESTIMATED FOR A STUPID',*
   ' PHYSICALLY IMPOSSIBLE INPUT. THE NUMBERS INPUT ARE OWNED BY THIS PROGRAM.')
  72 FORMAT(1H1)

```



```

SUBROUTINE MODE (PD,V,IMODE)
COMMON /TRONIC/ UU(6),VV(6),TAU(22),DAMP(22),NUMRTS,GAINB,
1 INDEX,STGAIN(6),TSTAR,COELTD,SLOT(3,9),
DIMENSION PD(10,11),SLT(3,9),ISLT(12,2),
DIMENSION HEAD(3,2,2),HEAD1(3,3,2),
DATA HHEAD /'LAT CYCLIC PEDAL F/A CYCLIC COLLECTIVE '/
DATA HEAD1 /'SDE SLP ANG.ROLL ANGLE YAW RATE FWD. VEL. ANG. OMNIDECK'/
IF ATK.PITCH ANGLF /
DATA ISLOT /3,4,2,1/
COLD=COELTD
WRITE (6,299)
ISLTF=0
INDEX=0
KSLTT=-2
DO 10 I=1,3
KSLTT=KSLTT+3
CALL SLTE (SLT,SLOT,KSLTT)
ISLT=ISLT+3
DO 9 J=1,2?
JSLT=ISLT(J,IMODE)
CALL SLTE (PD,ISLT,JSLTE,IMODE)
COELTD=COELTD/COLD
IF(I.EQ.1.AND. IMODE.EQ.-2) COELTD=COELTD*V
CALL TLEC (GAIN)
INDEX=INDEX+
STGAIN(INDEX)=GAIN*COELTD/GAINB
WRITE (6,301) (HEAD(I,L,IMODE),L=1,3),(HEAD(L,J,IMODE),L=1,3),
1 (UU(L),VV(L),L=1,3),COELTD
9 CONTINUE
CALL SLTT (SLOT,SLT,KSLTT)
10 CONTINUE
DO 669 I=19,21
IF(TAU(I)).NE.0..OR.DAMP(I).NE.0.) GO TO 669
N=I
GO TO 673
669 CONTINUE
670 CONTINUE
673 CONTINUE
DO 668 I=N,21
DAMP(I)=DAMP(I+1)
TAU(I)=TAU(I+1)
668 CONTINUE
674 CONTINUE
WRITE (6,300) (((HEAD(I,J,IMODE),I=1,3),(HEAD(I,K,IMODE),I=1,3),
1 (TAU(I+3*(K+2*j-3)),DAMP(I+3*(K+2*j-3)),I=1,3),
2 STGAIN(K+2*j-2),K=1,2),J=1,3),
3 (TAU(I),DAMP(I),I=19,21),GAINB,TSTAR
RETURN
290 FORMAT(1H*,57X,'FREQUENCY RESPONSE',/1X,'DEPEN'T.VAR.
1 VAR. REAL1 IMAG1 REAL2 IMAG2
2 REAL2 IMAG3 GAIN')
300 FORMAT ('ODEP. VAR. INDEP. VAR. ''6X,'TAU'' 12X,'DAMP''9X,'DAMP''12X,'TAU'' 2
1 11X,'DAMP''5X,'STATIC GAIN'/

```

3 6(1H .3A4.5X.3A4.7G14.6/1/
4 .OD E N 0 M I N A T O P .8X.7G14.6/
5 . ALL ROOTS, FREQUENCIES, PERIODS. AND TIME TO HALF OR MODE0550
6 DOUBLF AMPLITUDE ARE IN REAL SECONDS.// MODE0560
7 . ALL MAGNITUDES AND PHASE ANGLES HAVE BEEN DETERMINED FROM MODE0570
8M ROOTS IN AIR SECONDS.// MODE0580
9 . GAINS ARE DETERMINED FROM ROOTS IN REAL SECONDS.// MODE0590
A . ALL STATIC GAINS ARE IN NATURAL UNITS PER INCH OF STICK MODE0600
R. / . MODE0610
C . T* = "G13.5" MODE0620
301 FORMAT(1H .3A4.5X.3A4.7G14.6)
END

```

SUBROUTINE NSLSLOT (DIV1,DIV2,TSTAR,PD,SLNT,I1,KS,LS,UDSLOT,X)
  IMPLICIT UNSLOT(11,3),PQ(1n,11),SLNT(3,9),KS(3),LS(2)

  DO 10 I=1,3
  10 V=DIV2
    (F1,I,FO,11) DIV=DIV1
    LK=I
    DO 9 K=1,n,1
      UNSLOT(K,1)=PDIKS(I),LS(LK))/DIV
      LK=LK+1
    9 CONTINUE
    J=4
    DO 8 K=1,3
      J=J-1
      NSLOT(J+1)=SLNT(I,J)/DIV
      NSLOT(J+3,1)=SLNT(I,J+3)/DIV
      JDSLOT(J+6,1)=SLNT(I,J+6)/(X*DIV)
      V=DIV*TSTAR
      8 CONTINUE
    11 CONTINUE
    RETURN
  END

```

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SUBROUTINE OFFTRN
 COMMON /STRIAB/ D(121),DT(121),E(179),F(110),X(110),
 DL,DM,DN,DY,OZ,TX,TY,I2,PD(10,11).
 P12,SPO(6,6,3),XBW(21),XEL(14),
 XER(7),XFC(128),XFN(7),XFS(35),
 XGN(7),XIT(21),XMR(49),XTR(49),
 XWG(21),YMR(21),YTR(21),YWG(21),
 YEL(21),YFN(21),BLCG,DAMP,OEPO(10),
 EPDS,EPOX(10),MASS,QSV1,TMRS,TRRS,
 WLCG,XCOM(63),XJET(14),XMIN,AYPEP,
 BEAES(12),CMPCO,OMADQ,OYBOR,GUESS,
 NPASS,POPHI(10,11),STACG,TZERO,
 XMASY,DMA,AQ,OOOCOL,DTARSO,OYBDR,
 ENGRPM,MXPASS,PSD309,TRIM01,XLIMIT
 AY,VH,AGW,DT1(21),DT2(2),IX2,
 QMR,XXD,YD,ZD,ALGF,APFP,AYFP,
 CGML,COL(6),CYCF(3),CYCL(3),
 DIST,KCIT(20),PEDA(3),QMAX,
 QMRS,TIF,TMAX,XCIT(20,6),ALGE2,
 ALGE1,ALGE2,CGSTA,CPWIC,DIX12,
 DIVIX,DIZIV,DTZMT,DTZM1,DTZT1,FTKTS,
 HUBKM(2,2),HUBK(12,2),
 KREAD,PIU30,TSTAR(14),ZMAX2,ZMAX3,
 ASECOL,CYPWIC,GFARAT,PSD050,
 PS1STP,OXARAK,RUDIMO,ZDELT1,ZDELT2
 22,VXS(2),VVS(2),VSI(2),BETA(12,2),
 T,PCC(12),COSF(7,7,2),BETAM(2),BETAX(2),BETAZ(2),
 AIR(2),APOD,AROD,AYDD,AIR(2),
 OPSI(12,2),OTRP,NPSI(2),ZZTR,
 BETAD(12,2),ANPSI(2),
 CND2,GMAXV,RATE1, RATE2,STOP2,
 THROT(2),TRIND,XGUST,BETAZD(2),GMAXVI,
 GMAXV2,GMAXV3,GUSTYP,HMPHSIR(2),
 HUBKPS,HURKRS,HURTPS,HUBTRS,
 KONFIG,LNGTH1,PILGH1,PSIREF(2),
 START2,XMOMLI(12,2),
 RM,RTR,URH,ORTR,TIM1,T1TT,
 T2MT,T2TT,T2MT,XMAIL,XMAIL,
 XMB1,XMB1T,AIBPM,AIBPT,AIBRM,AIBRT,
 APTD,APTD,ARTD,ARTD,PSD,PSDT,
 XSTAHM,XSTAHM,YSTAHM,YSTAHM,
 HUBKP,HURKTP,HURKR,HUBKTR
 AZETA,AZETAT,VZETA,VZETAT
 V,IND,INAG,APMT,ARBT,AIBMT,BETA0(2),TDEL1,
 3ETA(2),HGUSTF,HGUSTF,VGUSTW,VGUSTE,
 VGUSTW,VGUSTF,GFWD,GLAT,GVERT,
 VXB,VZB,APD,VVB,ARO,AYO,
 COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
 APE,ARE,AIM,AIM,ALTP,BITR,
 XAR(2),YAR(2),ZAR(2),
 VIMR,VITR,ZETA,ZETATR,HMR,HJR,
 TMR,TTR,QMX,QTR,YMRF,YTRF
 Y(4,15n),
 COMMON /FORY/

```

QFAL MASS.(IXZ
I(Y(1.A5).EO.0.) GO TO 225
ARD=Y(1.A5)*SIN(APE)
CAPE=Y(1.A5)*COS(APE)
APD=CAPE*SIN(ARE)
AYD=CAPE*COS(ARE)
RN TO 226
225 CONT NUF
I(Y(2.A6).FO.1.) GO TO 224
APED=32.17*(Y(2.B6)-COS(APF)*COS(ARE))/V
CALL CATS (AYE.APE.ARE.AYFP.APF.P.0..AYPB.APPB.ARPB.1.-1)
CALL RATS (0..APFD.0..AYPS.APPB.ARPB.ARDS.APD.AVD.-1)
226 CONT NUF
DX = MASS*(APD*V2B-AYD*VBF)
DY = MASS*(AYD*VXB-ARD*VZB)
DZ = MASS*(ARD*VYB-APD*VXG)
JL = APD*(AYD*DIV(2Y-ARD*IXZ))
DM = ARD*AYD*DIX(2*(ARD+AYD)*(ARD-AYD)*IXZ
DN = APD*(ARD*DIV(X+AYD*IXZ))
CALL RATS (ARD,APD,AYD,D.-ZFTA,C.,ARD,APD,TV,-1)
CALL RATS (ARD,APD,AYD,AYRM,APRM,ARDMT,ARDMT,ARDTD,APTTD,TV,-1)
224 CONT NUF
QFTIPN
END

```

OFFT0550
OFFT0560
OFFT0570
OFFT0580
OFFT0590
OFFT0600
OFFT0610
OFFT0620
OFFT0630
OFFT0640
OFFT0650
OFFT0660
OFFT0670
OFFT0680
OFFT0690
OFFT0700
OFFT0710
OFFT0720
OFFT0730
OFFT0740
OFFT0750
OFFT0760
OFFT0770
OFFT0780


```

A(8(2)*APDO,ARDN,AYDD,AIR(2).
NPSI(12,2)*OTRR,NPSI(2),ZTR,
RETANT(12,2)*BNPSI(2),
COND2,GMAXV,RATE1,RATE2,STOP2,
THROT(2)*TRIND,XGUST,BETAZO(2),GMAXVI,
GMAXV2,GMAXV3,XGUSTP,MPSIR(2),
HUBKRS,HUBTPS,HUBTRS,
KONF(G,LNGTH1,P(LGH1),PSIREF(2),
START2,XMOML(12,2),
RM,RTB,DM,OTRR,TIMT,TIMT,
T2MT,T2TT,T2MT,T2TT,XMALT,
XMB1,XMB1,AIRPM,AIRPT,AIRPM,AIRPT,
APTD,APTD,APTD,APTD,PSO,PSO,
XSTAHM,XSTAHM,YSTAHM,YSTAHM,
HUBKP,HURKT,HURKT,HUBKTR
AZETA,AZETAT,VZETA,VZETA
i,V,IND,NWAG,APMT,APMT,AYMT,AYMT,BETA(2),TOELT,
RETAE(2),MGUSTE,MGUSTE,MGUSTE,MGUSTE,MGUSTE,MGUSTE,
VGUSTH,YGISTF,FGMD,GLAT,GVERT,
VXB,VZB,APD,VYB,ARD,AYD,
COLSTK,CYSTK1,CYSTK2,PEOAL,AYE,
APE,APE,AIM,R1M,ALTP,BTR,
XARI(2),YARI(2),YARI(2),
VIMR,VITR,ZFTA,ZFTA,ZFTA,ZFTA,MTR,MTR,
TMR,TR,OMX,QTR,YMRF,YTRF
AM(3)*ALL31*EXIT,ICOM(49)*IPSN,
NPART,NVARA,NVARB,NVARC,NSCALE
NVARS,NPRINT,NNTIME
)INTNSION P(48)(HEAD1(2,61,VAP(1))
LOU(VALENCE *(VARI1,COLOSTK1
DATA HEAD1/* MAIN FWD
COMMON /METER/ HEAD1(0,39(
(FICNO1,IF,FC,(GN FN 173
CALL WRFL
CALL WRD(13,VAR,XM1,PD,TAXL,TAXR)
173 IF(IFEXIT,NE,7,(GO TR 16,
CALI,WRNT
WRITE(6,171(
IN TN 177
167 WRITE(6,161(*NPASS
172 VRD(7,1,-QUIDIQ
WP(YT 16,80,(HEAD1(1,KMFNG(=1,2*(HEAO1((KMFNG+3*(I=1,2(
P(1)=T2MTEDTR
P(2)=T2T T0TDR
P(3)=.Sel(ALRWG+ALLWG(*OTRR
P(4)=T(MTONTTR
P(5)=T1T T0TDR
P(6)=ZFWMG+ZFLWC
P(7)=T2MTEDTR
P(8)=T2T T0TDR
P(9)=XFWMG+XFLWC
P(10)=AI MEOOTR
P(11)=ALTPDTR
P(12)=ALFLDTR
PARA0550
PARA0560
PARA0570
PARA0580
PARA0590
PARA0600
PARA0610
PARA0620
PARA0630
PARA0640
PARA0650
PARA0660
PARA0670
PARA0680
PARA0690
PARA0700
PARA0710
PARA0720
PARA0730
PARA0740
PARA0750
PARA0760
PARA0770
PARA0780
PARA0790
PARA0800
PARA0810
PARA0820
PARA0830
PARA0840
PARA0850
PARA0860
PARA0870
PARA0880
PARA0890
PARA0900
PARA0910
PARA0920
PARA0930
PARA0940
PARA0950
PARA0960
PARA0970
PARA0980
PARA0990
PARA1000
PARA1010
PARA1020
PARA1030
PARA1040
PARA1050
PARA1060
PARA1070
PARA1080

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P(13)=B)M*OTRR
P(14)=B)TR*OTRA
P(15)=ZFFLE
P(16)=TMQ
P(17)=TTR
P(18)=XFELE
WRITE (6,81) ((HEAD(1+2*j-1),j=1,10),P(3*j-2),P(3*j-1),
               (HEAD(1+2*j),j=1,10),P(3*j),j=1,6)
1
P(19)=MMR
P(20)=HTQ
P(21)=ALFIN*OTRR
P(22)=YMRF
P(23)=YTRF
P(24)=YFFIN
P(25)=OMX*PSDSSC
P(26)=OTR*PSDSSC*GEARAT
P(27)=AFFIN
WRITE (6,81) ((HEAD(1+3*j-8),I=1,10),P(3*j-2),P(3*j-1),
               (HEAD(1+3*j-NRUN),I=1,10),P(3*j),J=7,9)
1
P(28)=PSD30P
P(29)=P(28)*GEARAT
P(30)=AYE*OTRR
P(31)=ZFTA*OTRR
P(32)=ZETATP*OTRR
P(33)=ADE*OTRR
P(34)=A15(1)
P(35)=A15(2)
P(36)=ARE*OTRR
WRITE (6,81) ((HEAD(1+2*j+2),J=1,10),P(3*j-2),P(3*j-1),
               (HEAD(1+2*j+3),J=1,10),P(3*j),J=10,12)
1
P(37)= AXL
P(38)=--ZZD
2(39)=TAXR
P(40)=VM*FTXTS
P(41)=COLSTK
P(42)=W
P(43)=CYSTK!
P(44)=ENGRPM
P(45)=CMSTK2
P(46)=CGSTA
P(47)=PEDAL
P(48)=CGWL
WRITE (6,82) ((HEAD(1+J-9),J=1,10),P(J),J=37,48)
CALL TIMEX (TUSED,NTIME,TLEFT),
WRITE (6,2011) NPASS,TUSED
HPSUP=OMAX*PSDSSC
PTOT=P(25)*P(26)
IF (HPTOT.LE.HPSUP) GO TO 300
WRITE (6,1028)
EXIT=1.
300 RETURN
        OR FORMAT (1H0,49X,2A4,1X,2A4)
        OR FORMAT (9X,1A4,2F10.3,5X,10A6,F10.3/)
        OR FORMAT (9X,10A4,5X,10A4,10A4,F10.3/)

PARA1090
PARA1100
PARA1110
PARA1120
PARA1130
PARA1140
PARA1150
PARA1160
PARA1170
PARA1180
PARA1190
PARA1200
PARA1210
PARA1220
PARA1230
PARA1240
PARA1250
PARA1260
PARA1270
PARA1280
PARA1290
PARA1300
PARA1310
PARA1320
PARA1330
PARA1340
PARA1350
PARA1360
PARA1370
PARA1380
PARA1390
PARA1400
PARA1410
PARA1420
PARA1430
PARA1440
PARA1450
PARA1460
PARA1470
PARA1480
PARA1490
PARA1500
PARA1510
PARA1520
PARA1530
PARA1540
PARA1550
PARA1560
PARA1570
PARA1580
PARA1590
PARA1600
PARA1610
PARA1620

```

161 FORMAT(1H1,50H HELICOPTER IS ~~NOTE~~ IN STABLE CONDITION AFTER. PARA1630
1 15,12W ITERATIONS./16X,9H~~NOTE~~)
171 FORMAT(35H HELICOPTER IS IN STABLE CONDITION./)
1028 FORMAT(1H0,56H~~NOTE~~ POWER AVAIL PARA1660
TABLE)
2011 FORMAT (5X6HPART 1•16X13,12W ITERATIONS,20XF10.3.
1 35H MINUTES FLAPSFD COMPUTING TIME /1H1)
FND

```

SUBROUTINE /STAMAN/ ML121,XX,YY,A1,GOV,KPD,OPC,000,
      A1Y,APAC,ARBG,ASEP,AYAG,BWTC,
      RC,BMTK,BMTM,CGRD,DPIX,DPIZ,
      FHPT(12),RSS5,ALFPT,AVDMX,DEL12,
      DPIX7,DTBWT,DWLCG,MOELT,MGUST,
      MLTR1,MLTR2,ITOPS,KCTCR,JMEGM,
      PCDEL,QMRSAA,RCMASS,TRALY,TWOP1,VGUST,
      ISTOP,XAGUN,XAPYL,XARSPI(2),YAGUN,
      YARSPI(2),YGUST,ZAGUN,ZAPYL,ZARSPI(2),
      DELT2R,DSTACG,EIMAST,GPREL0,MLPYLD,
      IBrake,OMFGMD,OBRAKE,BETAZS(2),
      PCCGFD,PCGMAX,PCRATE,POINTR,ADELT1,
      ROELT2,RITORS,TPIND2
      C COMMON /FORV/ Y(4,150)
      PSOMQM=PSO-NMEGM
      Q1=AISI*PCDEL1
      Q2=Q1-.01*PCRATE
      IF(OPC.EQ.1C.) GO TO 224
      IF(Q2.GT.0.) PCDEL=PCDEL-SIGN(IPCRATE,PCDEL)
      GO TO 232
224 CONTINUE
      IF(02.GT.0.) GO TO 236
      IF(ABS(IPSDOM).LE.(PCGDE0*OMEGM)) GO TO 226
236 CONTINUE
      Q2=SIGN(IPCRATE,PSOMQM)
      Y0M=Y(1,84)-OMEGMD
      IF(PSOMQM/(Y0M+.2*PSOMQM).GT.0.) PCDEL=PCDEL+02
      IF(01.GT.PCGMAX*MOELT) PCDEL=PCDEL-Q2
      IF((IPSDOM/Y0M).GT.0.) GO TO 237
      IF(Q2.GT.MOELT*Q1/PCRATE) PCDEL=PCDEL-SIGN(IPCRATE,PCDEL)
232 CONTINUE
      DTZMT=DTZMT+PCDEL
226 CONTINUE
      RETURN
      END

```

```

SUBROUTINE PDZI (KL)
DIMENSION PD(10,11)
LOGICAL AYFP
KCONFIG=KL
RETURN
      MTPV PDZ (PD,AYFP)
      PERQ THE PARTIALS OF THE FLAP MOM OF ONE ROTOR WRT TO
      THE FLAP ANGLFS OF THE OTHER RUTIN
      DO 302 I=7,9
      DO 303 J=7,9
      PD(I,J+2)=0.
      303 PD(I+2,J)=0.
      IF TANDEM RETURN
      304 M(787,30)=KCONFIG
      IF SIDE-BY-SIDE WITH SIDESLIP RETURN
      SET LEFT ROTOR DERIVATIVES TO MAGNITUDE OF CORRESPONDING
      RIGHT ROTOR DERIVATIVES
      DO 272 J=9,10
      PD(9,J)=SIGN(PD(7,J-2)+PD(9,J))
      PD(10,J)=SIGN(PD(9,J-2)+PD(10,J))
      DO 292 I=1,6
      PD(J,I)=SIGN(PD(I,J-2)+PD(J,I))
      292 PD(I,J)=SIGN(PD(I,J-2)+PD(I,J))
      LEPO PARTIALS OF Y-FORCE, YAW, AND ROLL MOMENTS WRT
      F/A CYCLIC AND COLLECTIVE STICKS AND PITCH ANGLE
      DO 289 I=2,6,2
      PD(I,5)=0.
      DO 289 J=1,2
      289 PD(I,J)=0.
      RETURN
      SINGLE ROTOR CASES
      297 DO 298 I=9,10
      298 ZERQ THE PARTIALS OF THE MR FLAP MOM WRT TO PENDAL
      PD(I-2,4)=0.
      DO 299 J=1,3
      299 ZERQ THE PARTIALS OF THE TR FLAP MOM WRT STICKS
      299 PD(I,J)=0.
      299 RETURN
      END

```

```

SUBROUTINE PPILOT
COMMON /TOPLOT/ AM(3),AL(3),EXIT,ICOM(49),IPSN,
1      NPART,NVARA,NVARB,NVARC,NSCALE
1      NVARS,NPRINT,NTIME
COMMON /PLOTO/ HFAD(9,267)
DIMENSION A(266)
DIMENSION AC(3),AD(3),NVAR(3),RATE(3)
LOGICAL L,LINE(10),L1,L2,L3,L4,L5,L6,L7,L8,L9,L10
1      16*6.,17*7./,18*8.,'./,M
EQUIVALENCE (NVAR(1),NVARA)
IF(NPART.EQ.3) GO TO 4100
TRANSFER T-M FROM 3 TO 9 OR 9 TO 3
CALL C81L
GO TO 9999
4100 CONTINUE
C      WRITE HEADING FOR PLOT
CALL WROT
C      CHANGE PROPER PLOT SCALES
IF(NSCALE.LT.-4) GO TO 3003
NSCALE=NSCALE-4
AH(3)=AH(3)*1000.
AL(3)=AL(3)*1000.
3003 IF(NSCALE.LT.-2) GO TO 3004
NSCALE=NSCALE-2
AH(2)=AH(2)*1000.
AL(2)=AL(2)*1000.
3004 IF(NSCALE.LT.-1) GO TO 3005
NSCALE=NSCALE-1
AH(1)=AH(1)*1000.
AL(1)=AL(1)*1000.
3005 DO 4000 N=1,3
L=NVAR(N)
IF((AH(N).NE.AL(N))) GO TO 3010
AH(N)=0.
AL(N)=10.
3010 CONTINUE
IF(N.EQ.1) M=11
IF(N.EQ.2) M=12
IF(N.EQ.3) M=14
IF(L.GT.0.AND.L.LT.-267) GO TO 3011
WRITE(6,3015) M,(HEAD(K,267),K=1,9)
AH(N)=-1000.
AL(N)=-2000.
GO TO 4000
3011 WRITE(6,3015) M,(HEAD(K,L),K=1,9)
4000 CONTINUE
C      COMPUTE SCALING CONSTANTS
DO 4010 I=1,3
RATE(I)=(AH(I)-AL(I))/10.
AC(I)=10.*RATE(I)
4010 AD(I)=1.5-AL(I)*AC(I)
C      WRITE SYMBOL AND SCALE HEADING
WRITE(6,6) 11, AL(1),AM(1),RATF(1),13*11*12
WRITE(6,6) 12, AL(2),AM(2),RATF(2),15*11*14
PPL00010
PPL00020
PPL00030
PPL00040
PPL00050
PPL00060
PPL00070
PPL00080
PPL00090
PPL00100
PPL00110
PPL00120
PPL00130
PPL00140
PPL00150
PPL00160
PPL00170
PPL00180
PPL00190
PPL00200
PPL00210
PPL00220
PPL00230
PPL00240
PPL00250
PPL00260
PPL00270
PPL00280
PPL00290
PPL00300
PPL00310
PPL00320
PPL00330
PPL00340
PPL00350
PPL00360
PPL00370
PPL00380
PPL00390
PPL00400
PPL00410
PPL00420
PPL00430
PPL00440
PPL00450
PPL00460
PPL00470
PPL00480
PPL00490
PPL00500
PPL00510
PPL00520
PPL00530
PPL00540

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      WRITE (6,51) 14, AI(3), AH(3), RATE(3), 16, (2,14
      WRITE (6,7) 17,11,12,14
      5   INITIALIZE LINE TO BLANKS
      70 3100 I=1,101
      7100 LINE(I)=IR
      CALL TIMEFX (TUSED, TDELT, TLEFT)
      READ (31) IPSN,TA
      IF(T.GT.9999.E+04) GO TO 9999
      NTIME=NTIME+1
      IF(NTIME.EQ.NPRINT) NTIME=C
      IF(NTIME.NE.0) GO TO 6019
      <B=A(NVARA)*AC(1)+AD(1);
      KX=A(NVARC)*AC(2)+AD(2)
      KY=A(NVARC)*AC(3)+AD(3)
      C   CHCK FOR EQUALITY OF VARIABLES
      IF(KB.EQ.KX) GO TO 3101
      IF(KB.EQ.KY) GO TO 3102
      IF(KX.EQ.KY) GO TO 3103
      C   CHECK TO SEE IF VARIABLES FALL ON SCALE
      IF(KA.GE.1.AND.KR.LE.101) LINE(KB)=11
      IF(KX.GE.1.AND.KX.LE.101) LINE(KX)=12
      IF(KY.GE.1.AND.KY.LE.101) LINE(KY)=14
      GO TO 5000
      3101 IF(KB.EQ.KY) GO TO 3104
      FIRST AND SECOND VARIABLES ARE IN SAME POSITION
      IF(K3.GE.1.AND.KB.LE.101) LINE(KB)=13
      IF(KY.GE.1.AND.KY.LE.101) LINE(KY)=14
      GO TO 5000
      3102 IF(KB.GE.1.AND.KB.LE.101) LINE(KB)=15
      IF(KX.GE.1.AND.KX.LE.101) LINE(KX)=12
      GO TO 5000
      SECOND AND THIRD VARIABLES ARE IN SAME POSITION
      3103 IF(KA.GF.1.AND.KR.LE.101) LINE(KB)=11
      IF(KX.GE.1.AND.KX.LE.101) LINE(KX)=16
      GO TO 5000
      ALL THREE VARIABLES ARE IN SAME POSITION
      3104 IF(KB.GE.1.AND.KB.LE.101) LINE(KA)=17
      WRITE (6,5001) T,LINE
      5000 RESET LINE TO BLANKS
      IF(KA.GE.1.AND.KB.LE.101) LINE(KB)=10
      IF(KX.GF.1.AND.KX.LE.101) LINE(KX)=18
      IF(KY.GF.1.AND.KY.LE.101) LINE(KY)=19
      GO TO 6019
      CONTINUE
      CALL TIMEFX (TUSED, TDELT, TLEFT)
      WRITE (6,7000) TDELT
      RETURN
      6 FORMAT (1H *10X, 'SCALE ', 'AI,', ' FROM ', F11.3, ' TO ', F11.3,
      1      ' * 1 INCH = ', F9.3, '1X,AI, FOR ', 'AI, ', '+ ', 'AI,4X,
      2      ' IN SAME PRINT POS.')
      7 FORMAT (1H *5X,A1, ' FOR ', 'AI, ', '+ ', 'AI, ', '+ ', 'AI, ', ' ON SAME PRINT ', PPL01070
      15.0//67X,*INCHES*/T2C,*0*.T30,*1*.T40,*2*.T50,*3*.T60,*4*.T70,*5*.PPL01080

```

2740, *70, *71, *720, *90, *T110, *90, *T119, *100, *T120, *100, *T30, *100,
2 T40, *10, *T50, *10, *T60, *10, *T70, *10, *T80, *10, *T90, *10, *T100, *10,
4 T110, *10, T120, *10, T130, *10, T140, *10, T150, *10, T160, *10, T170, *10, T180, *10, T190, *10, T200, *10,
5 EQUAT (78X, SYMBR, A1, =, 9A4)
6 FQRMAT (1H, 5X, F9.2, 4X, 1n1A1)
7 FQRMAT (1H0, F15.5)
8 N

```

SUBROUTINE RATT (X,EPDX,XLIMIT,VARI)
COMMON /KVARTR/ KVAR(1)
DIMENSION VARI(11),X(12),EPDX(12)
RATIO=1.

10  I=1,10
    CHECK TO SEE IF ANY CORRECTION EXCEEDS LIMITS
    IF(AABS(X(I)).GT.XLIMIT) RATIO=ABSLIMIT/X(I)
    CHOOSE RATIO SO THAT LARGEST CORRECTION = LIMIT
    IF(RATIO.LE.RATIOL) GO TO 10
    RATIO=RATIOL
    I=1
11  CONTINUE
    MAKE CORRECTIONS
    DO 20 I=1,10
        VARI(KVAR(I))=VARI(KVAR(I))+X(I)*RATIO*EPDX(I)
    IF(RATIO.NE.1.) WRITE (6,40) X,RATIO,I
30  RETURN
40 FORMAT (1HD//1H *CORRECTIONS* 2X,10F11.7,
1      /1HC *RATIO APPLIED TO CORRECTION VECTOR IS * F10.7*
2      2X,*FROM COMPONENT * 13)
    END

```

```

SUBROUTINE RATS (X1,Y1,Z1,A1,A2,A3,X2,Y2,Z2,N1)
DIMENSION A(9)
      THREE DIMENSIONAL VECTOR TRANSFORMATION
      N1=1 FOR USUAL
      N1=-1 FOR INVERSE
      CALL MATRIX (A1,A2,A3,A*N1)
      X2=X1*A(1)+Y1*A(2)+Z1*A(3)
      Y2=X1*A(4)+Y1*A(5)+Z1*A(6)
      Z2=X1*A(7)+Y1*A(8)+Z1*A(9)
      RETURN
      END
C
C
C

```

RATSO010
RATSC020
RATSO030
RATSO040
RATSO050
RATSO060
RATSO070
RATSO080
RATSO090
RATSO100
RATSO110

```

SUBROUTINE READIN (IT,TAIRI)
COMMON /STRIAB/ D(21),DT(21),E(79),F(10),X(1D),
DL,OM,ON,OY,OZ,IY,I2,PD(10,11).
1 READ0020
2 READ0030
3 READ0040
4 READ0050
5 READ0060
6 READ0070
7 READ0080
8 READ0090
9 READ0100
A READ0110
B READ0120
C READ0130
D READ0140
COMMON /STRIMAS/
1 READ0150
2 READ0160
3 READ0170
4 READ0180
5 READ0190
6 READ0200
7 READ0210
8 READ0220
9 READ0230
KREAD,PLU30,TSTAB(14),ZMAX2,ZMAX3,
ASECOL,CYPWIC,GEARAI,PSD550.
PS1STP,OXBRAK,RUDTM,ZDELT1,ZDELT2
COMMON /TOPLOT/
AH(3),AL(3),EXIT,ICOM(49),IPSN,
NPART,NVARA,NVARB,NSCALE
1 NVARS,NPRINT,NTIME
1 DIMENSION TAIR(15)

C * * NAMELIST DICTIONARY
C
* NAMELIST /CHANGE/ XFS *XMR *YMR *XTR
* DT *YTR *XNG *YNG *XEL
* AXEL *XFN *YFN *XJEI *XBM
* XCOM *XFC *XCN *XER *XIT
* IF (INPART,NE,10) GO TO 10
* READ (5,1011) IPSN *ICON
* GUESS = 2.
* RETURN
10 CONTINUE
READ (5,1003) XFS *XMR *YMR *XTR
READ (5,1003) XMR *D *YTR
READ (5,1003) XTR *DT *YTR
READ (5,1003) XMG *YNG *XBM
READ (5,1003) XEL *YEL *XJEI
READ (5,1003) XFN *YFN *XIT
READ (5,1003) XJET *XNG *XBM
READ (5,1003) XBN *YNG *XEL
READ (5,1003) XCOM *XFC *XCN
READ (5,1003) XFC *XGN *XER
READ (5,1003) XFS *XMR *YMR *XTR
READ0440
READ0450
READ0460
READ0470
READ0480
READ0490
READ0500
READ0510
READ0520
READ0530
READ0540

```



```

SUBROUTINE RODA
      COMMON /STBD/ X,Y,U,V,T,A(9,2),LY,IYS,G(6,2),SL(M,10,1D)
      DOUBLE PRECISION UNPV,B$(6,1),SLIM2,T,X,Y,U,V,YS,DF(6),X(CS
1(6,1),TS1,TS2,TS3,TS4,UNP(11),DXN1,DYN1,UN,VN,DUN,Y1,
2 AVG,DRN,DIN,TS5,TS6,TS7,TS8,TS9,DY,TST,AT,ATX,RODA050
3 XX,YX,EVL(2,2),UNPT,DS,DVN,US,US1,US2,US3,DXSP,DXS,DUNI,RODA060
4,DXN1,UI,U2,U3,U4,US,US6,US7,DI,YSX,DABS,DSORT,DSIGN,A,G
EQUivalence (DF(1),UN),(DF(2),VN),(DF(3),DUN),(DF(4),DVN),
1(5),DUN1),(DF(6),DVN1),((UNP(11),YS),(UNP(11),U1),(UNP(12),U2),
2(UNP(13),U3),(UNP(4),U4),(UNP(5),U5),(UNP(6),U6),(UNP(7),U7),RODA090
?((UNP(8),U8),(UNP(9),U9),(UNP(10),U10),(UNP(11C),U3))
      DATA FA,FR/. . . . ./
      IFT=1
      IR=0
      (S=0
      (H=C
      IYF=2
      DO 97 I=1,10
      97   RS(I)=0.
      DS=.0005
      TS=0.
      UNPV=0.
      SLIM2=SLIM*SLIM
      X=5.272
      Y=0.
      GO TO 15
      ENTRY RODB
      IF ((IFT-3) 7, 47, 69
      7       EVL(1,IFT)=X
      EVL(2,IFT)=U
      GO TO (4,9)*IFT
      4       X=10.53
      5       IFT=IFT+1
      GO TO 15
      9       X=0.
      IF (EVL(2,1).NE.0..OR. EVL(2,2).NE.0.) GO TO 5
      WRITE (6,657)
      657  FORMAT (1, ' FUNCTION VALUF IS ZERO FOR ALL VALUES OF X' )
      657  GO TO 92
      42  IFT=4
      IF (U,EO,0.,AND.V,EO,0.) IH=1
      10  ICT=0
      FM=FA
      IF (DABS(G(IR+1,1))+DABS(G(IR+1,2))**11.63
      63  IF ((X-G(IR+1,1))*2*(Y-G(IR+1,2))**2-.05*TST) 12,12,60
      11  IF (IH) 67,67,38
      67  IF (IFT) 35,35,66
      35  DS=.01
      11  IFT=1
      14  X = -.1274396
      14  Y=X
      GO TO 174
      66  IF (G(IR,1),EO,0.,AND.G(IR,2),EO,0.) GO TO 14
      12  G(IR+1,1)=X

```

```

60      G(IIR+1,2)=Y
      X= G(IIR+1,1)*.999
      Y=DMAX1(DABS(G(IIR+1,2)*.999D0),DABS(1.0-3*G(IIR+1,1)))
174      DO 40 I=1,11
40      UNP(I)=0.
      GO TO 15
17      DXNI=DX
      DYNI=DY
      DXSP=DXS
      DX=DS*X
      DY=DS*Y
      DXS=DX*DX+DY*DY
      X=X+DX
      Y=Y+DY
      RETURN
15      ICT=ICT+1
      IF(U.EQ.0..AND.V.EQ.0.) GO TO 160
      IF(I,IIR)62,62,19
      CALL,OVERFL((OV))
      DO 23 J=1,15
      XI=X-CS(J)
      YI=Y
      TS4=Y/U
      LF(BS(J))90,90,91
      VI=(Y+V)*XI
      XI=(XI-Y)*(XI+V)+BS(J)
      TS2=U/(XI*XI+VI*VI)
      U=(XI+VI*TS4)*TS2
      V=(TS4*XI-VI)*TS2
      CALL,OVERFL((OV))
      GO TO (160,62,160),IOV
      US=DABS(U)+DABS(V)
      U7=U7+US-US3
      US=UA
      US3=US2
      US2=US1
      US1=US
      IF(ICT-2)13,17,84
84      AVG=3./U7
      DO 126 I=1,6
126      DF(I)=UNP(I)*AVG
      IF(DY)55,56,55
      DRN=DX/DXNI
      TS3=(DUN-DRN*DUN)*DRN
      TS=1.*DRN
      TS1=TS*DUN+TS3
      TS5=-2.*UNETS
      TS7=TS1*TS1+2.*TS3*TS5
      DXNI=DX

```

```

RODA0550
RODA0560
RODA0570
RODA0580
RODA0590
RODA0600
RODA0610
RODA0620
RODA0630
RODA0640
RODA0650
RODA0660
RODA0670
RODA0680
RODA0690
RODA0700
RODA0710
RODA0720
RODA0730
RODA0740
RODA0750
RODA0760
RODA0770
RODA0780
RODA0790
RODA0800
RODA0810
RODA0820
RODA0830
RODA0840
RODA0850
RODA0860
RODA0870
RODA0880
RODA0890
RODA0900
RODA0910
RODA0920
RODA0930
RODA0940
RODA0950
RODA0960
RODA0970
RODA0980
RODA0990
RODA1000
RODA1010
RODA1020
RODA1030
RODA1040
ROMA1050
RODA1060
RODA1070
RODA1080

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DX=TS5*DX/(TS1+DSIGN(DSORT(DABS(TS7)),TS1))
GO TO 138
55 DPN=(DX*DXN1+DY*DYN1)/DXSP
DIN=(DY*DXN1-DX*DYN1)/DXSP
TS1=DUN-DRN*DUN1+DIN*DVN1
TS2=DVN-DIN*DUN1-DRN*DVN1
TS3=DRN*TS1-DIN*TS2
TS4=DRN*TS2+DIN*TS1
TS=1.*DRN
TS1=TS*DUN-DVN*DIN+TS3
TS2=TS*DUN+DUN*DIN+TS4
TS5=2.*(VN*DIN-UN*TS1)
TS6=-2.*(VN*TS+UN*DIN)
TS7=(TS1-TS2)*(TS1+TS2)+2.*((TS5*TS3-TS4*TS6)
TS8=2.*((TS1*TS2+TS4*TS5+TS3*TS6)
TS9=DSBS(TS7)*DSORT(1.+((TS8/TS7)**2))
TS3=DSORT(1.5*DSBS(TS9+TS7))
TS4=DSIGN(DSORT(1.5*DSBS(TS9-TS7)).TS8)
134 IF(TS1+TS3+TS2*TS4) 1132.131.131
132 TS4=-TS4
TS3=-TS3
131 TS7=TS1+TS3
TS8=TS2+TS4
TS3=TS7**2+TS8**2
TS1=(TS5*TS7+TS6*TS8)/TS3
TS2=(TS6*TS7-TS5*TS8)/TS3
DXN1=DX
DYN1=DY
DX=TS1*DXN1-TS2*DYN1
DY=TS2*DXN1+TS1*DYN1
DXSP=DXS
Y=V+DY
IF (DABS(Y) .GT. 1.D-5 .AND. DARS(Y/X) .GT. 'S.D-4 ) GO TO 128
Y=0.
DY=0.
128 YS=Y*Y
138 X=X+DX
TS=X*Y+YS
IF(TS-1.D-15)41.41.74
41 FM=FR
38 IM=0
73 X=0.
Y=0.
YS=0.
GO TO 160
DXS=DX*DX+DY*DY
74 AT=DXS/TST
IF (AT .LE. 1.D-15 ) GO TO 20
IF (ICT -21 ) 305.87.88
99 IF(AT-ATX) 87.70.70
05 AT=ATX
X=XX
Y=YY
YS=VSX

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```

R00A1090
R0DA1100
R0DA1110
R0DA1120
R0DA1130
R0DA1140
R0DA1150
R0DA1160
R0DA1170
R0DA1180
R0DA1190
R0DA1200
R0DA1210
R0DA1220
R0DA1230
R0DA1240
R0DA1250
R0DA1260
R0DA1270
R0DA1280
R0DA1290
R00A1300
R0DA1310
R0DA1320
R0DA1330
R0DA1340
R0DA1350
R0DA1360
R0DA1370
R0DA1380
R0DA1390
R0DA1400
R0DA1410
R0DA1420
R0DA1430
R0DA1440
R0DA1450
R00A1460
R0DA1470
R0DA1480
R0DA1490
R00A1500
R00A1510
R0DA1520
R00A1530
R00A1540
R00A1550
R00A1560
R00A1570
R0DA1580
R00A1590
R00A1600
R0DA1610
R0DA1620

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75   F4=FA
      GO TO 20
20   ATX=AT
      XX=X
      YX=Y
      YSK=Y5
70   IF (ICT .LT. 25 ) GO TO 305
      IF (AT .NE. ATX ) GO TO 95
      IF (ICT.GE. 40) GO TO 75
305   (F(TST-SLIM2)15.15.50
31   Y=-Y
35(I$)=YS
I$=I$-1
85   ICT=0
160  AT=0.
20  CONTINUE
    IF (IR.EQ.1) GO TO 51
    IR=IR+1
    I$=I$+1
    CS(I$)=X
    GL(IR,1)=X
    GL(IR,2)=Y
    (IF(Y.NE.0..AND.ICT.GT.0) GO TO 31
    DO 61 I=1,2
    TS2=EVL(1,I)-X
    IF (YS.GT.0.) TS2=TS2*TS2+YS
61   EVL(2,I)=FVL(2,I)/TS2
    D1=(EVL(2,1)+EVL(2,2))*S
    UNPT=D1*T
    IF (I.OAIS(EVL(2,1)-EVL(2,2)) .LE. 1.0-4* DABSI(D1)) GO TO 92
    IF (IR.LT. 10 ) GO TO 10
    51 CONTINUE
    WRITE (6,54)
54   FORMAT (1 SOLUTION EXCEEDS MAXIMUM NUMBER OF ROOTS*)
    GO TO 36
50   WRITE (6,52) SLIM
52   FORMAT (1 NEXT ROOT GREATER THAN F10.1. * RADIAN * )
55   WRITE (6,655)
655  FORMAT (1 INCOMPLETE FUNCTION. RESTORE F(I$) REMAINING. )
?2   (D=?
    ID=IR
    X=UNPT
    RETURN
  END

```

```

SUBROUTINE ROTAN (N)
COMMON /ANDJIT/ A1,R1,XK,XV,VI2,VI4,APD4,APF4,AROM,APFM,
AYFM,ROTIJ,XK43,XLIM,CBFAC,
GDISK(120),NPS1,TANAL,TANBL,
TANT,TANT2,DCAFAK,IPRINT,NORADL,
SHEAPL(12),SHEAPD(12),SMFARR(12),
XMDML(12),XMD*D(12),
*      ,APDS,ARDS,PFAC,RFAC,APDS,ARDS,
*      ,ROTAC010
*      ,ROTAC020
*      ,ROTAC030
*      ,ROTAC040
*      ,ROTAC050
*      ,ROTAC060
*      ,ROTAC070
*      ,ROTAC080
*      ,ROTAC090
*      ,ROTAC100
*      ,ROTAC110
*      ,ROTAC120
*      ,ROTAC130
*      ,ROTAC140
*      ,ROTAC150
*      ,ROTAC160
*      ,ROTAC170
*      ,ROTAC180
*      ,ROTAC190
*      ,ROTAC200
*      ,ROTAC210
*      ,ROTAC220
*      ,ROTAC230
*      ,ROTAC240
*      ,ROTAC250
*      ,ROTAC260
*      ,ROTAC270
*      ,ROTAC280
*      ,ROTAC290
*      ,ROTAC300
*      ,ROTAC310
*      ,ROTAC320
*      ,ROTAC330
*      ,ROTAC340
*      ,ROTAC350
*      ,ROTAC360
*      ,ROTAC370
*      ,ROTAC380
*      ,ROTAC390
*      ,ROTAC400
*      ,ROTAC410
*      ,ROTAC420
*      ,ROTAC430
*      ,ROTAC440
*      ,ROTAC450
*      ,ROTAC460
*      ,ROTAC470
*      ,ROTAC480
*      ,ROTAC490
*      ,ROTAC500
*      ,ROTAC510
*      ,ROTAC520
*      ,ROTAC530
*      ,ROTAC540
COMMON /ROMAN/
*      ,VYS(12),VZS(12),BETA(12,2),
*      ,T,PCC(2)*COS(E(7,2)),BETAN(2),BETAX(2),BETAZ(2),
*      ,A1B(2),APD0,ARD0,AIR(2),
*      ,UPS(12,2),DTR,MPS(12),Z2TR,
*      ,BETA(12,2),BNPS(12),
*      ,CON02,GMAXV,RATF1,RATE2,STOP2,
*      ,THROT(2),TRIND,XGUST,BETAZ0(2),GMAXV1,
*      ,GMAXV2,GMAXV3,GUSTY3,MNPSSR(2),
*      ,HUBKPS,MUAKPS,MURATPS,MUBTRAS,
*      ,KONFIG,LNGTM1,PILGM1,PSIREF(2),
*      ,START2,X4NMNL(12,2),
*      ,R(2),OR(2),T(12),
*      ,T2(2),TZB(2),XMA(2),
*      ,XMB(2),AIBP(2),A1BR(2),
*      ,APDR(2),ARDR(2),PSIO(2),
*      ,XSTAH(2),YSTAH(2),
*      ,HUBKPR(2),HUBKRR(2),
*      ,AZETAR(2),VZETAR(2),
*      ,I,V,IND,NWAG,APMT,ARMNT,AYBMT,AYBMT,BETA0(2),TOELT,
*      ,BETAF(2),HGUSTE,HGUSTF,HGUSTW,VGUSTE,
*      ,VGUSTW,VGUSTE,GFWD,GLAT,GVERT,
*      ,VXB,VZB,APD,VVB,ARD,AYD,
*      ,COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
*      ,APE,ARE,A1M,BLM,ALTR,BITR,
*      ,XAR(2),YAR(2),ZAR(2),
*      ,VIR(2),ZETAR(2),HFORCE(2),
*      ,THRUST(2),TORQUE(2),YFORCE(2),
*      ,J,W,ITM,VHS(2),LINK,QELF,VRDT(2),
*      ,VSND,YFIN(2),ZFEL(2),A1BAL(2),
*      ,BIBAL(2),COND1,SWING,PILGM2,PNGELL,
*      ,S(2),PMOM(2),RMOM(2),
*      ,AM(2),CT,PI,XB(2),ALT,ADR(2),EXH(2),
*      ,NXR(2),RBH(2),SWC(2),UHS,COMB(2),LRDT(2),
*      ,QAB(2),RTRP(2),TAIR(14),CONEK(2),DCAFR(2),FVIND,
*      ,NWARD,
*      ,SMKR(2),XLIMIN(2)
*      ,XLIMAX(2),XLIMIN(2)
*      ,TWIST(20,2),CLRAOK(2),DELTA3(2),
*      ,LAMBDAL(2),UPGUST,UGUST,UTGUST,WRATOR,
*      ,ER(2),ERX(2),
*      ,7 COMMON /TOPLOT/ AM(13),AL(13),EXIT,ICOM(49),IPSN,
*      ,NPART,NVARB,NVARC,NSCALE
*      ,NVARS,NPRINT,NTIME
*      ,DIMENSION FLAP(2,2),HEADRC(6),AA(60)
*      ,FOUILLANCE(IFLAP(1,1),AIM),(AA(1)),SHEARL(1))
*      ,DATA HEADRO/,MAIN FWD RTAIL AFTLEFT/,/

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```

A1=FLAP(1,N)
A1=FLAP(2,N)
DO 200 K=1,60
A(K)=0.
200 CONTINUE
N1PSI=NPSI(N)
NDRADL = NXR(N)
IPRINT = 0
IF(COND2.GT.2.5) IPRINT = 1
FILINK.LT.4.OR.IND.NE.1.DR.TAIR(1).GT.(T+TDELT)) GO TO 199
IF(N.EQ.1.AND.NVARC.EQ.0.AND.NVARD.NE.0) GO TO 199
IF(N.EQ.2.AND.NVARC.EQ.0.AND.NVARD.EQ.0) GO TO 199
IPRINT=1
199 CONTINUE
CALL RATS (GFWD,GLAT,GVERT,0.,-ZETAR(N),0.,GMFD,GMLAT,GMVERT,-1)
NRDT=KONFIG+3*(N-1)
RDTRJ=3-2*N
AISVAI
B1SV=A1
T1S=T1(N)
T2S=T2(N)
KOUNT=0
CALL DOGS (ARD,APD,AYD,XAR(N),YAR(N),ZAR(N),VXR,VYR,VZR)
AYFM=AYE
CALL CATS (0.,-ZETAR(N),0.,AYE,APE,ARE,AYFM,APFM,ARFM,1,1)
CBFAC=COS(APFM)*COS(ARFM)
CALL RATS (0.,0.,WRDTR,AYFM,APFM,ARFM,XWRDT,ZWRDT,-1)
FFWD=XWRDT*GMFWO
FSIDE=YWRDT*GMLAT
VXR=VXR+VXB
VYR=VYR+VYB*SWC(N)
VZR=VZR+VZB
C
VZR(N)=SQRT(VXR**2+VYR**2+VZR**2)
ALT=-22
V12=-5*VRDT(N)**2
V14=V12**2
601 CONTINUE
FWD=S*HFORCE(N)
FLATS=YFORCE(N)
DT1=SMKR1(N)*(HFORCE(N)-FFWD)
T1(N)=T1*S*DT1
T2(N)=T2*S*DT2
KOUNT=KOUNT+1
AYBM=C.
APBM=-ZETAR(1)
ARBM=C.
IF(N.EQ.1) GO TO 207
T2(N)=-T2(N)
AROR1(N)=-ARDR(N)
YFORCF(N)=-YFORCE(N)
R1=-81
AYBM=AYBM

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```

APRM=APRM
AR10=AR10
AR11=AR11
ALT=278
XLIM=XLI MAX(N)
CALL VXR,VYR,VZP,AYRM,APRM,ARBW,VXS(N),VYS(N),VZS(N),-1
IHS=VYS(N)**2+VYS(N)**2
VHS(N)=SORT(UHS)
VYS(2)=-VYS(2)
TANT1=TANIT(N)
TANT2=TAN(T2(N))
CALL RATS(LPD,APD,AYB,APBM,ARBW,ARDS,APDS,AY:S,-1)
CALL RATS(LRD,APD,AYD,AYB,APBM,ARBW,ARDS,APDS,AYDUS,AYDDS,-1)
PSN2=PSN(N)*2
APNS=APNS-VZETAR(N)
ARDM=PSN2*ARDS+APDS-1,TAR(N)
APIM=PSD2*APDS-APDS
IF(ILINK.NE.2) GO TO 289
APDR(N)=APDS
IF(N.FD.2) ARDR(N)=ARDS
APDE(N)=APDS
289 CONTINUE
IF(ILINK.FD.4) GO TO 288
APDBS=APDP(N)-APDS
ARDBS=ARDR(N)-APDS
288 CONTINUE
XK=11.25*VHS(N)
IF(VHS(N).GT.-1.167*OR(N))) XK=1.36*OR(N)-1.5*VHS(N)
IF(VHS(N).GT.-.5733*CR(N))) XK=.5*OR(N)
(IF(ARCSFR(N)).LT.R(N)) GO TO 286
XK=XK/OP(N)
GO TO 1001
286 XK=.5
1001 CONTINUE
XK43=XK*1.333333
NCAFXK=NCAFR(N)*XK
IF(GUSTUP.LT.1.) GO TO 17
AYFM=AYF
CALL CATS(LAYB,APBM,ARBW,AYF,APF,AYFM,APFM,ARFM,1,1)
DO 19 K=1,120
GDISK(K)=0.
19 CONTINUE
17 CONTINUE
CALL ITROT(N)
IF(EXIT.NF..N.) RETURN
IF(N.EQ.1) GO TO 304
VYS(2)=-VYS(2)
T2(N)=T2(N)
ARDR(N)=ARDR(N)
YFNQCE(N)=YFNQCF(N)
A1=-91
PMUM(N)=-RMOM(N)
304 IF(ILINK.FD.4.OR.SWKRI(N).EQ.1.) GO TO 606
ABSMF=ARS(HFORCE(N)-FWDS)

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```

A3SYF=ABS(YFORCE(N))-FLATS)
IF(KOUNT.FO.1) GO TO 606
IF(KCOUNT.EO.1) GO TO 602
ABOVF CARD USED IF DIAGNOSTICS WANTED
IF(ABSHF.GT.1..OR.ABSYF.GT.1.) GO TO 671
GO TO 676
602 WRITE(6,603) HEADRO(NRO),ABSHF,ABSYF
606 CONTINUE
IF(TRIMD.EQ.0..AND.N.EQ.2) GO TO 305
IF(GUSTYP.LT.1..OR.I.NE.2) GO TO 305
IF(N.EQ.1) WRITE(6,9070) VGUSTW,VGUSTE,MGUSTW,MGUSTE,YGUSTF
CALL DISK (GDISK)
305 IF(NWAG.FO.0) GO TO 503
LROT(N)=POT(N)+1
DLIFT=THRUST(N)-THROT(N)
CALL MAG (R:N),LROT(N),N,V,TDEL,T,RED,DLIFT)
THRUST(N)=THRUST(N)-RFD
503 IF(ILINK.EQ.2.AND.J.EQ.1) RETURN
A1BAL(N)=A1
31BAL(N)=BL
FLAP1=N=A1SV
FLAP2=N=A1SV
IF(IPRINT.EQ.0) RETURN
IF(N.EQ.1.AND.NVARD.NE.0) RETURN
DO 702 L=1,13
TAIR(L)=TAIR(L+1)
702 CONTINUE
TAIR(14)=9999.
RETURN
503 FORMAT(1H0//10X,A4,0,0 ROTOR H-FORCE AND Y-FORCE NOT BALANCED. DELTROTA1920
1AS ARF*2G15.7*5X,*LRS,*)
C 707N FORMAT(61H VGUSTW VGUSTE MGUSTE MGUSTF
1GUSTF/1H .6FLN.3) FND

```

```

SETE0010
SETE0020
SETE0030
SETE0040
SETE0050
SETE0060
SETE0070
SETE0080
SETE0090
SETE0100
SETE0110
SETE0120
SETE0130
SETE0140
SETE0150
SETE0160
SETE0170
SETE0180
SETE0190
SETE0200
SETE0210
SETE0220
SETE0230
SETE0240
SETE0250
SETE0260
SETE0270
SETE0280
SETE0290
SETE0300
SETE0310
SETE0320
SETE0330
SETE0340
SETE0350
SETE0360
SETE0370
SETE0380
SETE0390
SETE0400
SETE0410
SETE0420
SETE0430
SETE0440
SETE0450
SETE0460
SETE0470
SETE0480

SUBROUTINE SETE
COMMON /FORCE/ A(17)
COMMON /STRIAB/ D(21),DT(21),E(79),F(10),X(10),
DL,DM,DNDX,DY,DZ,IY,IZ,PD(10,11),
DTR,ERR(10),KMI,RHO,
1 P12,SPD(6,6,3),XBM(21),XEL(14),
XER(71),XFC(28),XFN(71),XFS(35),
XGN(7),XIT(21),XMR(49),XTR(49),
XWG(21),YMR(21),YTR(21),YWG(21),
YEL(21),YFN(21),BLCG,DAMP,DEPD(10),
EPDS,EPDX(10),MASS,QSV1,TMRS,TPS,
WLCG,XCON(63),XJFT(14),XMIN,AYFP,
BETAES(1),CNPCD,DHADQ,OYDR,GUESS,
NPASS,PDPH1(10,11),STACG,TZERO,
XMAST,DHADQ,DQDCOL,OYRSQ,OYDR,
ENGRPM,MXPASS,PSD30P,TRINDI,XLIMIT
2 V,IND,NWAG,APRM,TARBMT,Aybmt,BETA(2),TDELT,
BETA(2),HGUSTW,HGUSTF,HGUSTW,VGUSTE,
VGUSTW,VGUSTF,GFWD,GLAT,GVFR,
VXB,VZB,APD,VYB,ARD,AYD,
COLSTK,CYSTKL,CYSTK2,PEDAL,AYE,
APE,ARE,AIM,RIM,AIMR,BLTR,
XAR(2),YARI(2),ZARI(2),
VIMR,VITR,ZETA,ZETATR,HMR,MTR,
TMR,ITR,QMX,OTR,YMRF,YTRF
3 DIMENSION KS(6)
DATA KS/1,13,22,59,46,33/
DO 301 L=1,6
301 D(L,7)=-A(KS(L))
3 CONTINUE
301 F(L)=A(K)
3 CONTINUE
74 F(72)=TMR
F(73)=HMR
F(74)=YMRF
F(75)=QMX
F(76)=TTR
F(77)=HTR
F(78)=YTRF
E(79)=QTR
2SV1=.5*(QMX+QTR)
BFTAES(1)=BETA(1)
BFTAES(2)=BETA(2)
TMRS=TMR
TTR5=TTR
KMI=6
99 TUPP
END

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```

SUBROUTINE SLTE (PD ,J,L,M)
COMMON /TRONIC/ UU(6),VV(6),TAU(22),DAMP(22),NUMRTS,GAINB,
! INDEX,STCAIN(5),TSITAP,COEFLD,SLOT(1,9)
DIMENSION PD(10,11),K(3,2)
DATA K /2,5,4,1,3,5/
DO 10 I=1,3
SLOT(I,J)=PD(K(I,M),L)
10 CONTINUE
CALL SRT
RETURN
END

```

```
SLTT0010
SLTT0020
SLTT0030
SLTT0040
SLTT0050
SLTT0060
SLTT0070
SLTT0080
SLTT0090
SLTT0100

SUBROUTINE SLTT (A,B,K)
DIMENSION A(3,9),B(3,9)
L=K+2
DO 10 I=L,3
DO 10 J=K,L,
A(I,J)=B(I,J)
B(I,J)=0.
10 CONTINUE
      RETURN
END
```

```

SUBROUTINE SOLVE
COMMON /STRIAB/ O(21),DT(21),E(21),F(10),X(10),
1      DL,DM,DN,DY,DZ,IY,I2,PD(10,11),
2      DTR,EPO,ERR(10),KMI,RHO,
3      R12,SPD(6,6,3),XBW(21),XEL(14),
4      XEP(7),XFC(29),XFN(7),XFS(35),
5      XGN(7),XIT(21),XMR(4,9),XTR(4,9),
6      XWG(21),YMR(21),YTR(21),YWG(21),
7      YEL(21),YFN(21),BLG,DAMP,DEPD(10),
8      FDSS,EPDX(10),MASS,OSVI,TMRS,TRRS,
9      WLCG,XCM(63),XJET(14),XMIN,AYEFP,
10     BETAES(21),CNPCD,DHAD0,DYBDR,GUESS,
11     NPASS,PDPHI(10,11),STACG,TZERO,
12     XMAST,DHAD0,DCOL,DTRSS0,DYBDBR,
13     FNGRPM,MXPASS,PSD30P,TRIN01,XLIMIT
14     COMMON /TOPLOT/ AH(13),AL(3),EXIT,ICOM(49),IPSN,
15     NPART,NVARA,NVARB,NVARC,NSCALE
16     COMMON /KMI/ KMI,LIMFAR,EQUATIONS IN KMI VARIABLES
17
18     V1 = 1 + KMI
19     NM1=KMI-1
20     DO 150 M = 1, KMI
21     K = M + 1
22     C      CHECK FOR ZERO ON DIAGONAL
23     IF(ABS(PDPHI(M,M)).GE.1.E-05)GO TO 100
24     DO 81 I=M,KMI
25     IF(ABS(PDPHI(I,M)).GE.1.E-05)GO TO 82
26     C      SINGULAR MATRIX NO SOLUTION
27     EXIT=1.
28     RETURN
29
30     82 DO 85 III=1,N1
31     3*PDPHI(I,III)
32     PDPHI(I,III)=PDPHI(M,III)
33     AS PDPHI(M,III)=B
34
35     100 DO 110 J = K, N1
36     110 PDPHI(M,J)=PDPHI(M,J)/PDPHI(M,M)
37     IF(KMI.LT.K1)GO TO 160
38     DD 150MP = K, KMI
39     DO 150 J = K, N1
40     150 PDPHI(MP,J)=PDPHI(MP,J)-PDPHI(MP,M)*PDPHI(M,J)
41     DO 180 OM = 1, KMI
42     180 X(M)=PDPHI(M,N1)
43     DO 250 K1 = 1, NM1
44     250 X(M)=X(M)-PDPHI(M,J)*X(J)
45
46     END

```

```

SUBROUTINE SRT
COMMON /STBD/ UX,UY,U,V,T,A(9,2),ID,IO2,G(6,2),SLIM, ID,IL
COMMON /TRONIC/ UU(6),VV(6),TAU(22),DAMP(22),NR,GAINR,
INDEX,SGAIN(6),TSTAR,CDL,SLOT(3,9)
1 DOUALF PRECISION UX,UY,U,V,T,A,UR,G,U
      ID=6
      IO=3
      IO2=9
      IL=1
      SLIM=100000.
      T=1.
      CALL R00A
      UR=(UX-UY)*(UX+UY)
      II=7*UX*UY
      DO 2 L=1,3
      M=3*L-3
      DO 2 I=1,3
      N=M+
      K=3*I-2
      A(N,1)=SLOT(L,K+2)+SLOT(L,K+1)*UX + SLOT(L,K) *UR
      A(N,2)=SLOT(L,K+1) *UY + SLOT(L,K)
      CALL DET
      CALL R00B
      IF (IL) 161,24,161
      NR=ID
      IF (NR.GT.4) NR=4
      CL=UX
      DO 3 J=1, ID
      UU(J)=GI(J,1)
      VV(J)=GI(J,2)
      3 RETURN
      END

```

2

SUBROUTINE STAB

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COMMON /FDRCF/ XF,XFRMG,XFLMG,XFFILE,XFFUS,XFRJET,
1   XFLJET,XFM,XFTTR,XFGUN,XFFIN,XFM,
2   YF,YFFUS,YFRJET,YFLJET,YFMR,YFTR,
3   YFGUN,YFFIN,YFW,
4   ZF,ZFRMG,ZFFFILE,ZFFUS,ZFRJET,
5   ZFLJET,ZFMR,ZFGUN,ZFM,
6   QL,LRG,LWG,LELF,LFSU,LRJET,LLJFT,
7   LMR,LTR,LLGUN,LFIN,LOMR,LOTR,
8   OM,MRMG,MLWG,MFLF,MFUS,MRJET,MLJET,
9   MPR,MTR,MGUN,MFIN,MMR,MOTR,
ON,NRMG,NLWG,NELF,NFUS,NRJET,NLJET,
NMR,NTR,NGUN,NFIN,NOMR,NOTR
N(21),DT(21),F(179),F(115),X(10),
DL,DM,DN,DX,DY,DZ,IX,IY,IZ,PD(10,11),
DTR,FPD,FPP(10),KML,RMC,
R12,S0(6,6,3),XW(21),XEL(14),
XEP(7),XFC(28),XFN(7),XFS(35),
XGN(7),XIT(21),XMR(49),XTR(49),
XWG(21),YMR(21),YTR(21),YWG(21),
YEL(21),YFN(21),BLCG,DAMP,DEPD(10),
FDOS,EPDX(10),MASS,OSV1,TMPS,TRS,
WLCC,XCON(63),XJE(1,1),XMIN,AEFP,
BETAES(2),CMPCD,DMADJO,DYDR,GUESS,
NPASS,PDPH(1n,11),STACG,TZERO,
XMAST,DMADAQ,QQDCOL,DTRRSQ,DYBDR,
FNGRP,MPASS,PSD30P,TRIND1,XLIMIT
AY,VHAGM,DT1(2),DT2(2),IXZ,
OMR,XXD,YD,ZZD,ALGF,APFP,AYFP,
CGML,COLL(6),CYCF(3),CYCL(3),
DIST,KCIT(2n),PEDA(3),OMAX,
OMRS,TIME,TMAX,XCIT(20,6),ALGEZ,
ALGF1,ALGE2,CGSTA,CPWIC,DIX12,
DIYIX,DIZIY,DTZMT,DTZMI,DTZT1,FTKTS,
HUKM(2,2),HUKI(2,2),
KREAD,PIU30,TSTAR(14),ZMAX2,ZMAX3,
ASECOL,CYPWIC,GFARAT,PSD550,
PS1STP,OXBRD,ROUDIND,ZDELT1,ZDELT2
O,AP,PE,OMG,T2M,TIM,T2M,
T2T,T1T,T2T,TAEL,CZFT,PSDD,
SZFT,TAXR,XAMG,XLNK(16),ZAWG,
ALCP,ALFIN,ALLWG,ALRG,COELE,COFIN,
COLMG,CDRMG,CLELE,CLFIN,CLLMG,CLRMG,CWING,
CYCRL,CYCR2,CZET4,CZET6,CZET9,RANGE,
SZETS,SZET7,SZET8,WGCOL,XAEL,XAFIN,
XAFUS,XAJET,YAFIN,ZAEEL,ZAFIN,ZAFUS,
YAELF,YAFUS,YALWG,YARWG,YALJET,YARJET,
ZAET,ALECR1,ALGFDP,BOTT04,CZET11,
CZET12,CZET13,E1'ETA,HALFP1,SZET10,
4   XAPYLD,ZAPYLD,ZFLdG1,ZFRWG1
6   *TZMS,TIMS,T2MS,T2TS,T1TS,T2TS,
8   CLOCK,FLCK,XLCLK,TCLOCK
C   ZZ,VXS(2),VYS(2),VZS(2),BETA(12,2),
0   T,PCC(2),COSE(7,7,2),BETAN(2),BETAX(2),BETAZ(2),
*
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STAB0550
 STAB0560
 STAB0570
 STAB0580
 STAB0590
 STAB0600
 STAB0610
 STAB0620
 STAB0630
 STAB0640
 STAB0650
 STAB0660
 STAB0670
 STAB0680
 STAB0690
 STAB0700
 STAB0710
 STAB0720
 STAB0730
 STAB0740
 STAB0750
 STAB0760
 STAB0770
 STAB0780
 STAB0790
 STAB0800
 STAB0810
 STAB0820
 STAB0830
 STAB0840
 STAB0850
 STAB0860
 STAB0870
 STAB0880
 STAB0890
 STAB0900
 STAB0910
 STAB0920
 STAB0930
 STAB0940
 STAB0950
 STAB0960
 STAB0970
 STAB0980
 STAB0990
 STAB1000
 STAB1010
 STAB1020
 STAB1030
 STA1040
 STA1050
 STA1060
 STA1070
 STA1080

AIR(2) • APDD. ARDD. AYDD. AIR(2).
 DPS(12,2). DTRR. NPS(12). ZZTR.
 RETAO(12,2). RNPS(12).
 COND2. GMAXV. RATE1. RATE2. STOP2.
 THROTT(2). TRIND. XGIST. BETAZD(2). GMAXVI.
 GMAXV? . GMAXV3. GUSTYP. HNPSIR(2).
 HURKPS. HURKPS. HUSTPS. HUBTRS.
 KONFIG. LNSTH1. PILGHI. PSIRFF(2).
 START2. XMOML1(12,2).
 RM. RIR. ORP. OPTR. TINT. TITT.
 T2MT. T2TT. T2WT. T2TT. XMAL. XMAL.
 XMB1. XMBIT. AIRPM. AIRPT. AIBRM. AIBRT.
 APTO. APTTD. ARTO. ARTD. PSD. PSD1.
 XSTAHH. XSTAHT. YSTAHH. YSTAHT.
 HUBKP. HURKTP. HUBKR. HUBKTR.
 AZFTA. AZETAT. VZFTA. VZETAT.
 1 • V. IND. NHAG. APMT. ARBMT. AYBMT. BFTAO(2). TOELT.
 BETAE(2). HGUSTF. HGUSTF. HGUSTW. VGUSTE.
 VGUSTW. YGUSTF. GFWD. GLAT. GVFR.
 VYB. VTB. APD. VYB. ARD. AYO.
 CULSTK. CYSTK1. CYSTK2. PEDAL. AYE.
 APE. ARE. AIM. BIM. ALTR. BITR.
 XAR(2). YAR(2). ZAR(2).
 VIMR. VJTR. ZFTA. ZFTA. HMR. HTR.
 T4R. TTR. QMX. QTR. YMFR. YTRF.
 J. M. ITM. VHS(2). LNK. QLE. VJHT(2).
 VSND. YFIN(2). ZTEL(2). AIBAL(2).
 OIAL(2). COND1. SWING. PILCH? . PWGFLI.
 RM. PTR. PHOMM. PMWMT. RMNM. RMOMT.
 AH(11). AL(3). Fxit. ICOM(49). IPSN.
 NPART. NVARR. NVARR. NVARC. NSCAIF
 NVARS. NPRINT. NTIME
 CNTMUN / KVARTP / KVARI(10)
) IMESSION VAR(6). EPON(6). A(71). XS(6). -FAD1(?)
 1 • VAR(6). INIT(4). DAPTO(6). JARTD(6). DAPPTD(6).
 2 • DARTD(6). VARSV(4). DPS1SV(7,2)
 CQUIVALENCE (VARI(1). VXB). (A(1)). XFI). (VARI(1)). COLSTK1
 DATA HEAD). MAINTAIL //
 DATA KS(12,2) • 32.45.58.71/
 LINR = 3
 KVAP(5) = 5
 KVAP(6) = 5
 DT741 = RFTAE(1)*PCC(1)
 DT742 = RFTAE(2)*PCC(1)
 V19PS = V19MH
 V19KS = V19PR
 NO 313 N=1.4
 VAPS(1) = VAP1(N)
 CNTTNIE
 IF (PSD.EQ.0.) GO TO 309
 DO 315 I=1,7
 DO 315 I=1,7
 DO 315 I=1,7
 DO 315 I=1,7
 DO 315 I=1,7

```

J=1
NPSI(1)=12
NPSI(2)=12
CALL NOPSI1 (NPSI1,NPSIR,NPSI,DPSI1)
CALL AJACR8
STM=60
A1PRA=XMA1
A1PRA-XMA1
A1BPA=XMAIL
A1BPA-XMBIT
A1BRT=XMBIT
309 CONTINUE
J=2
CALL SETE
CALL JACOBI
DO 312 J=1,6
DAPTD(J)=C.
DARTD(J)=C.
DAPTD(J)=0.
DARTD(J)=0.
312 CONTINUE
KOUNTS=1
NCOL=n.
COLS=COLSTK
JINIT(1)=100.*RANGE/COLL(1)
JINIT(2)=100.*CYCF(3)/CYCF(1)
UNIT(3)=100.*CYCL(3)/CYCL(1)
UNIT(4)=100.*PEDA(3)/PEDA(1)
CALL RATS (XKD,YTD,ZZD,AYE,ARE,VXB,VYB,VZB,-1)
DO 306 J=1,6
DO 306 J=1,6
PDI(I,J)=PDI(I,J)*UNIT(J)
306 CONTINUE
WRITE (6,404)
CALL MRVP (2,VARI,KM1,PD,TAXL,TAXR)
CALL RATS (0,0.,W,AYE,APF,ARF,XFM,YFM,ZFM,-1)
EPDD(1)=EPDS*100.
EPDD(2)=EPDS*100.
EPDD(3)=EPDS
EPDD(4)=EPDS*100.
EPDD(5)=EPDS
EPDD(6)=EPDS
DAPTD(3)=EPDD(3)
CALL RATS (0.,EPDD(3),0.,AYBMT,APBMT,ARBMT,DARTTD(3),DAPTTD(3),
1 TV,-1)
DARTD(5)=EPDD(5)*CZET
CALL RATS (EPDD(5),0.,0.,AYBMT,APBMT,ARBMT,DARTTD(5),DAPTTD(5),
1 TV,-1)
DARTD(6)=EPDD(6)*SZET
CALL RATS (0.,0.,EPDD(6),AYBMT,APBMT,ARBMT,DARTTD(6),DAPTTD(6),
1 TV,-1)
DO 55 J=1,6
VARI(J)=VARI(J)+EPDD(J)
APTD=APTD+DAPTD(J)
ARTD=ARTD+DARTD(J)
55

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```

APTTD=APTTD+DAPTTD(J)
APTTD=ARTTD+DARTTD(J)
IF(J<FO,1) GO TO 307
VAP(J-1)=VAR(J-1)-EPDD(J-1)
APTD=APTD-DAPTD(J-1)
ARTD=ARTD-DAPTD(J-1)
APTTD=APTTD-DAPTTD(J-1)
ARTTD=ARTTD-DAPTTD(J-1)

102 CONTINUE
RECTAF(1)=BETAES(1)
RECTAF(2)=BETAES(2)
TMR=1MRS
TPR=TPS

103 CONTINUE
CALL ANAL
IF(XFT.NE.0.) RETURN
IF(KOUNTS.NF.,0) GOTO 305
PRINT(6,401)
TV=VAD(1)
VAD(1)=VAP(1)*DTTR
-ALL WARP(1,VAR,KM1,PD,TAXL,TAXR)
VAD(1)=TV
-ALL WRF
CONTINUE
IF(J.NF.,1,0R.7FTA.LT.1.396263.OR.PSD-EQ.3..OR.CLOCK.NE.0.) GOTO 304
STAB1630
STAB1640
STAB1650
STAB1660
STAB1670
STAB1680
STAB1690
STAB1700
STAB1710
STAB1720
STAB1730
STAB1740
STAB1750
STAB1760
STAB1770
STAB1780
STAB1790
STAB1800
STAB1810
STAB1820
STAB1830
STAB1840
STAB1850
STAB1860
STAB1870
STAB1880
STAB1890
STAB1900
STAB1910
STAB1920
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STAB1940
STAB1950
STAB1960
STAB1970
STAB1980
STAB1990
STAB2010
STAB2020
STAB2030
STAB2040
STAB2050
STAB2060
STAB2070
STAR2D80
STAB2090
STAB2100
STAB2110
STAB2120
STAB2130
STAB2140
STAB2150
STAB2160

104 IF(J.NE.1,0R.7FTA.LT.1.396263.OR.PSD-EQ.3..OR.CLOCK.NE.0.) GOTO 304
IF(KOUNTS.NF.,0) GOTO 302
IF(KOUNTS.GT.20) GO TO 302
IF(KOUNTS.NE.1) DDCOL=(QSV7-QSV3)/DCOL
IF(KOUNTS.EQ.1) QSV1=QSV2
)COL=DCNL-DO/DCNL
COLSTR=COL$ANDCOL
CALL SWAS(COLSTR)
T7MT=T74+DTZM1+DTZMT+ASECOL
T7TF=T71+DTZT1+TRIND*(DTZMT+ASECOL)
T1MT=T14+DT1(1)
T1T=T14+DT1(2)
T2WT=T24+DT2(1)
T2TF=T24+DT2(2)
IN TO 303

105 CONTINUE
CULSTR=COLS
CALL SWAS(COLSTR)
T2TF=T24+DTZT1+TRIND*(DTZMT+ASECOL)
T1MT=T14+DT1(1)
T1T=T14+DT1(2)
T2MT=T24+DT2(1)
T2TF=T24+DT2(2)
KOUNTS=n
QDNU=(QSV3-QSV1)/EPDN(1)

```

```

374 CONTINUE
    SPC(J,1,1)=XF-E(1)
    SPC(J,2,1)=ZF-F(22)
    SPC(J,3,1)=OM-E(46)
    SPC(J,4,1)=YF-E(13)
    SPC(J,5,1)=OL-E(33)
    SPC(J,6,1)=ON-E(159)
    SPC(J,1,2)=TMR-E(72)
    SPC(J,2,2)=HMR-E(73)
    SPC(J,3,2)=ALBAL(1)-ALM
    SPC(J,4,2)=YMRF-E(74)
    SPC(J,5,2)=QWX-E(75)
    SPC(J,6,2)=RIBAL(1)-RIM
    SPC(J,1,3)=TRR-E(76)
    SPC(J,2,3)=HTR-E(77)
    SPC(J,3,3)=ALBAL(2)-ALTR
    SPC(J,4,3)=YTRF-E(78)
    SPC(J,5,3)=OTR-E(79)
    SPC(J,6,3)=B18AL(2)-B1TR
    DO 54 LL=1,3
    DO 56 K=1,6
    SPC(J,K,LL)=SPD(J,K,LL)/EP00(J)
56 CONTINUE
    DO 57 K=1,71
      A(K)=A(K)-E(K)
57 CONTINUE
    WRITE(6+4C2)
    CALL WPFM
    L=1
    DO 59 K=1,6
      N=KS(K)
      RAL=1.
      IF(A(L).NE.0.) RAL=100./A(L)
      DO 58 KK=L,M
        A(KK)=A(KK)*RAL
58 CONTINUE
      L=M+1
59 CONTINUE
    WRITE(6+4C3)
    CALL WPFM
65 CONTINUE
    VAR(6)=VARI(6)-FP00(6)
    APTD=APTD-DAPTD(6)
    ARTD=ARTD-DARTD(6)
    APTTD=APTTD-DAPTTD(6)
    ARTTD=ARTTD-DARTTD(6)
    WRITE(6+152) ((SPD(I,J,1)*I+1,6),J=1,6)
    WRITE(6+153) HEAD1((I*(J+2)+1,6)*J=1,6)
    WRITE(6+153) HEAD1((2*((SPD(I,J,3)+I=1,6),J=1,6))
    XAELE=XAELE-XAEMG
    (FLOWG.GE..5*Q) GO TO 300
    QMG=.5*Q
    CW(NG=1.

```

```

SWING=1.
300 CONTINUE
  DO 299 J=1,4
    DO 298 I=1,6
      P0(I,J)=PD(I,J)/V
298 CONTINUE
299 CONTINUE
CALL LMODE (V,QMG,E(12),E(32),CMING,XAEI,W)
LINK=4.
BETA(E(1))=BETAES(1)
BETA(E(2))=BETAES(2)
TMR=TMR
TTR=TTR
VIMR=VIMRS
VITR=VITRS
AIBPM=0.
AIBRM=0.
AIBPT=0.
AIBRT=0.
DO 311 J=1,13
  TSTAR(J)=TSTAR(J+1)
311 CONTINUE
  TSTAR(14)=9999.
  DO 314 J=1,4
    VARI(J)=VARSV(J)
314 CONTINUE
  IF(DPSI.EQ.0.) GO TO 308
  NPSI(1)=BM
  NPSI(2)=BTR
  CALL NOPSII (NPSI,MNPSIR,BNPSI,DPSI)
  DO 316 I=1,7
    DPSI(I,1)=DPSISV(I,1)
    DPSI(I,2)=DPSISV(I,2)
316 CONTINUE
  ITM=7
308 CONTINUE
  CALL TIMEX (YUSFN,DTIME,TLFFF)
  WRITE (6,2) DTIME, TUSED
  RETURN
2) FORMAT (1H0,10X,F7.3, MINUTES USED IN STAB ,SX,F8.3.
   , MINUTES TOTAL RUN TIME)
1 1 FORMAT (1H0,4TX,'STABILITY PARTIAL DERIVATIVE MATRICES'
1 1   /1H0,30X,'W','17X,'0','17X,'V','17X,'P','17X,'R'.
?   /1H0,4X,'X-FORCE'           '6G18.7/
3   '5X,'Z-FORCE'             '6G1A.7/
4   '5X,'PITCH MOMENT'        '6G1B.7/
5   '5X,'Y-FORCE'             '6G1B.7/
6   '5X,'ROLL MOMENT'         '6G1B.7/
7   '5X,'YAW MOMENT'          '6G1B.7/
8   '5X,'H-FORCE'             '6G1B.7/
9   '5X,'F/A FLAPPING'       '6G1B.7/
1 1 FORMAT (1H0,4X,'ROTOR'
/5X,'THRUST'                 '6G1B.7/
?   '5X,'F/A FLAPPING'       '6G1B.7/

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4      /5X, 'Y-FORCE'          '6G18.7/  
5      5X, 'TORQUE'          '6G18.7/  
6      5X, 'LAT FLAPPING'    '6G18.7/  
400 FORMAT (1HO, 'DQ/DCOL = ', 'G15.7.2X, 'FT-LBS/PERCENT')  
1      1HO, 'DQ/DU'           = 'G15.7.2X, 'FT-LBS/SEC' //  
2      1HO, 'DCOL'            = 'G15.7.2X, 'PERCENT')  
401 FORMAT (1H1)  
402 FORMAT (1HO, 63X, 'DELTA')  
403 FORMAT (1HO, 58X, 'NORMALIZED DELTA')  
404 FORMAT (1H1, 30X, 'THE FIRST FOUR ROWS OF THIS MATRIX ARE LBS OR FT-STAB3340  
1LRS PER INCH OF CONTROL MOVEMENT')  
END
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STAB3250  
STAR3261  
STAB3270  
STAB3280  
STAB3290  
STAB3300  
STAB3310  
STAB3320  
STAB3330  
STAB3340  
STAB3350  
STAB3360
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```

SUBROUTINE START
COMMON /STR1AB/ D(21),DT(21),E(79),F(10),X(10),
DL,DM,DN,OY,OZ,IX,IY,IZ,PO(10,11).
?    DTR,EPD,EPR(10),KMI,RHO.
?    R12,SPD(6,31),XB(21),XEL(14).
?    XER(7),XFC(28),XFN(7),XFS(35),
?    XGN(7),XIT(21),XMR(49),XTR(49),
?    XNG(21),YMR(21),YTR(21),YWG(21),
?    YEL(21),YFN(21),BLG,DAMP,DEP(10),
?    FPD5,EPDX(10),MASS,OSV1,TMRS,TTRS,
?    MLGG,XCON(63),XJET(14),XMN,AYFP,
?    BETAES(12),CNPCD,DHADQ,OYOR,GUESS,
?    NIPASS,POPMLIC,11),STAG,ZERD,
?    XMAST,OHADAQ,000COL,DTRSQ,DYB08R,
?    ENGRPH,MXPASS,PS030P,TRINDL,XLIMIT
?    OMR,XXD,YYO,ZZD,ALGF,APFP,AYFP,
?    CGNL,COLL16),CYCF(3),CYCL(3),
?    DIST,KCIT(27),PFDA(3),QMAX,
?    QMRS,TIME,TMAX,XCIT(20,6),ALGEZ,
?    ALGEI,ALGE2,CGSTA,CPMIC,0IX12,
?    DIVIX,0IZIV,DTZMT,DTZML,DTZTI,FTKTS,
?    HURK(2,2),HURK(2,2),
?    KREAD,PIU30,TSTAB(14),ZMAX2,ZMAX3,
?    ASECOL,CYPMIC,GEARAT,PS0550,
?    PS1STP,QXBRK,RUNIND,2,DEL1,2,DEL12
?    HU(2),XX,YY,AYI,GOV,KPO,OPC,QQQ,
?    RIV,APBG,ARBG,ASFP,AYBG,BWTC,
?    RC,BWTK,BWTH,CGBL,DPIX,DP12,
?    FHPT(2),R550,ALERT,AYOMX,DEL12,
?    OPIXZ,DTBWT,DWLCG,HDLT,HGUST,
?    MLTR1,MLTR2,ITOPS,KTCTR,JMEGM,
?    PCDEL,QMRS,RMASST,TRALT,TMCPI,VGUST,
?    ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,
?    YARS(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
?    DELT2R,DSSTACG,EIMAST,GPREL,HPYLD,
?    TARRAKE,IMEGD,OBRAKE,BETAZS(2),
?    PCCGDO,PGCMAX,PCRATE,P910TR,ROELII,
?    RDELT2,RITORS,TRIN02,
?    O,AP,PEO,QMG,I2M,T1M,T2M,
?    T2T,T1T,T2T,AEF,CZET,PS00,
?    SZET,TAXI,TAXI,XANG,XLMK(16),ZANG,
?    ALCYP,ALFIN,ALLWG,ALRMG,CDLE,COFTN,
?    C0LNG,CDRNG,CLFL,CLFIN,CLLNG,CLRNNG,
?    CYCRI,CYCR2,CZFT4,CZET6,CZET9,RANGE,
?    S2ETS,SZET7,SZET8,WGCL,XAEL,XAFIN,
?    XAFUS,XAJFT,YAFIN,ZAEL,ZAFUS,
?    YAEL,YAFUS,YALMG,YARMG,YALJET,YARJET,
?    ZAJET,ALECR1,ALGFPO,BOTTOM,CZET11,
?    CZET12,CZET13,EIZFTA,HALFPI,SZET10,
?    XAPYLD,YGUSTW,ZAPYLD,ZFLNG1,ZFRNG1
?    ,TZMS,TIMS,T2MS,T2TS,T1TS,T2TS,
?    CLOCK,FLICK,XLOCK,TCLOCK
?    ZZ,VXS(2),VYS(2),VZS(2),BETA(12+2).
COMMON /ROMAN/

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* * * * *
 1 P C C (2) . COSE (7.7.2) . BFTAN (2) . BETAX (2) . BETAZ (2) .
 A1B (2) . APDD . ARDF . AYDD . ATR (2) .
 NPSI (12.2) . DTRQ . NPSI (12) . Z2TR .
 BETAD (12.2) . BNPSI (12) .
 COND? . GMAXV . RATE1 . PATE2 . STOP2 .
 THROT (2) . TRIND . XGUST . HNPSTC (2) . GMAXV1 .
 GMAXV2 . GMAXV3 . GUSTP . HNPSTC (2) .
 MURKPS . MURKRS . MURTPS . MUBTRS .
 KCONFIG . LNGTH1 . PILGHI . PSIREF (2) .
 START2 . XMOML (12.2) .
 RH . RTR . DPM . DRTR . TIMT . TITT .
 T2MT . T2TT . T2MT . T2TT .
 XMB1 . XMRIT . AIRPM . AIRPT . AIRRM . AIRBT .
 APTD . AFTTD . ARTD . ARTD . PSD . PSDT .
 XSTAHH . XSTAHT . YSTAHH . YSTAHT .
 MURKP . MURKTP . MURKR . MUBKTR
 COMMON /MANARD/
 AZETA . AZETAT . VZETA . VZETAT .
 I . V . IND . NWAG . APRMT . ARBMT . AYBMT . BETAO (2) . TDELT .
 BETAF (2) . MGUSTE . MGUSTF . MGUSTW . VGUSTE .
 VGUSTW . YGUSTF . GFWD . GLAT . GVFR .
 VX8 . VZB . APD . VVB . ARD . AYD .
 COLSTK . CYSTK1 . CYSTK2 . PEDAL . AYE .
 APE . ARE . AIM . RIM . ALTR . BILTR .
 XARI (2) . YARI (2) .
 7 VIMR . VITR . ZETAR (2) . HMR . HTR .
 THRUST (2) . QMX . QTR . YMRF . YTRF .
 J . W . ITM . VHS (?) . LINK . QLE . VROT (2) .
 VSND . YFIN (2) . ZFFL (2) .
 BIBAL (2) . COND1 . SWING . PILGH2 . PWGEL1 .
 2 COMMON /ROSTAR/
 A (2) . PMOM (2) . RMOM (2)
 AM (2) . CT . PI . XA (2) . ALT . ADR (2) . EXH (2) .
 NXR (2) . RBH (2) . SWC (2) . UHS . CDHB (2) . LROT (2) .
 ZAIB (2) . RTRP (2) . TAIR (14) . CDNEK (2) . DCAFR (2) . FVIND .
 NVARD .
 SWKR (2) . SWKR2 (2) . TIP10 (2) . TIP38 (2) .
 TWST (20.2) . CLRADK (2) . DELTA3 (2) .
 LAMBDA (2) . UPGUST . URGUST . MROTOR .
 ERM . FRTR . ERXM . FRXT .
 XLMAXM . XLMAXT . XLMINM . XLMINT
 BH (2) . C3 . C4 . RW . CLP . CLR . OCD . OOL . DON . VIM .
 RAIB (2) . CLBN . CNRD . ETAO . NJET .
 QFIN .
 VIER . CLBCL . YFS (14) .
 4 CNBCL . CNPCL . CNRCD . CNRCL . COLKS . D3ELE .
 FNSMC . LMING . PMREL . PMRNG .
 PTRFN . RPIST . WAKE . YERO (31.5) .
 6 APBJFT . ARBJET . AYBJET .
 7 CNPCD1 . CNPCD2 . COLJET . DXWGEI . DZWGEI .
 8 ETAQMX . PMGMKI . RCWING . SWINGH .
 9 VENTER . VXVER .
 COMMON /KVARTR/ KVARI (10) .
 DIMENSION HEAD (4.14) . HEAD1 (2.2) .
 DATA HEAD / .
 ! WING .
 FUSFLAGE MAIN ROTOR TAIL ROTOR
 ELEVATOR FIN/RUDDER JET
 8 STAR1060
 STAR1070
 STAR1080

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?NWEIGHT   CONTROLSFLIGHT CONSTANTS ALLOWABLE ERROR
?RATION    STAB TIMES AIRLOAD TIMES/
DATA HEAD1 / ROLL YAW /
REAL IX,IY,IZ,IXZ
GUESS=0.

READ IN DATA THRU SUBROUTINE READIN.

CALL READIN (IT,TAIR)

C CALCULATE PHYSICAL CONSTANTS.

DTR=.174532925E-01
Q=.5*RHO
PIU30=9.54929658
DTRR50=3282.80635
DTRR=57.2957795
R12=1./12.
PI=3.1415926536
PO10TR=-.174532925E-03
HALFP1=1.570796327
TWOP1=6.283185307
TRIND=0.
TRIND1=0.
RAIB(1)=0.
RAIB(2)=0.
RAIB(1)=0.
RAIB(2)=0.
GEARAT=0.

C WRITE OUT HEADING.

CALL WRNT
WRITE (6,100)
WRITE (6,101) (HEAO(I,1),I=1,4),XFS

C CALCULATE CONSTANTS FOR FUSELAGE - SEE INPUT FORMAT GUIDE FOR
DESCRIPTION OF CONSTANTS.

W=XFS(1)
STACG=XFS(5)*R12
WLCCG=XFS(6)*R12
WLCC=XFS(7)*R12
CGSTA=XFS(5)
CGALE=XFS(6)
CGML=XFS(7)
XAFUS=STACG-XFS(2)*R12
YAFUS=XFS(3)*R12-BLCG
ZAFUS=WLCC-XFS(4)*R12
IX=XFS(8)
IY=XFS(9)
IZ=XFS(10)
IXZ=XFS(11)

STAR1090
STAR1100
STAR1120
STAR1130
STAR1140
STAR1150
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STAR1170
STAR1180
STAR1190
STAR1200
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STAR1470
STAR1480
STAR1490
STAR1500
STAR1510
STAR1520
STAR1530
STAR1540
STAR1550
STAR1560
STAR1570
STAR1580
STAR1590
STAR1600
STAR1610
STAR1620

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YFS(1)=XFS(20)
YFS(2)=XFS(21)*DTRR
YFS(3)=XFS(15)
YFS(4)=XFS(16)*DTRR
YFS(5)=XFS(17)
YFS(6)=XFS(18)*DTRR
YFS(7)=XFS(22)
YFS(8)=XFS(23)*DTRR
YFS(9)=XFS(24)*DTRRSQ
YFS(10)=XFS(26)
YFS(11)=XFS(27)*DTRR
YFS(12)=XFS(28)*DTRRSQ
YFS(13)=XFS(25)*DTRRSQ
YFS(14)=XFS(32)
WR=XFS(29)/WR12
XAPYL=(XMR(0)-XFS(30))*WR
ZAPYL=(XMR(10)-XFS(31))*WR
MLPYLD=XFS(33)
WRITE(6,101)(HEAD(I+2),I=1,4),XMR,0,YMR
C          CALCULATE CONSTANTS FOR MAIN ROTOR - SEE INPUT FORMAT GUIDE FOR
C          DESCRIPTION OF CONSTANTS.
C          CALCULATE CONSTANTS FOR TAIL ROTOR - SEE INPUT FORMAT GUIDE FOR
C          DESCRIPTION OF CONSTANTS.
C          IF(XMR(13).NE.0.) GEARAT=XTR(13)/XMR(13)
C          PSDT=PSD*GEARAT
C          IF(XTR(14).NE.0.) TRIND=1.
C          SWC(2)=1.-XTR(28)
C          CALL INRO(ZETAR,BH,BA18,XMR,0,B,1)
C          WRITE(6,101)(HEAD(I+3),I=1,4),XTR,DT,YTR
C          CALCULATE CONSTANTS FOR TAIL ROTOR - SEE INPUT FORMAT GUIDE FOR
C          DESCRIPTION OF CONSTANTS.
C          IF(XMR(13).NE.0.) GEARAT=XTR(13)/XMR(13)
C          PSDT=PSD*GEARAT
C          IF(XTR(14).NE.0.) TRIND=1.
C          SWC(2)=1.-XTR(28)
C          CALL INRO(ZETAR,BH,BA18,XTR,0,B,2)
C          WRITE(6,101)(HEAD(I+4),I=1,4),XWG,YWG
C          CALCULATE CONSTANTS FOR WING - SEE INPUT FORMAT GUIDE FOR
C          DESCRIPTION OF CONSTANTS.
C          QMG=5*Q*XWG(1)
C          XAWG=STACG-XWG(2)*R12
C          YAWG=XWCG(3)*R12-BLCG
C          ZAWG=WLCG-XWG(4)*R12
C          AGW=XWG(5)*DTR
C          PMRWG=XWG(6)
C          PWGMK1=XWG(9)*DTR
C          FTAQMX=XWG(10)
C          CL80=XWG(12)
C          CLRCL=XWG(13)
C          CLR=XWG(14)
C          STAR1630
C          STAR1640
C          STAR1650
C          STAR1660
C          STAR1670
C          STAR1680
C          STAR1690
C          STAR1700
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C          STAR2020
C          STAR2030
C          STAR2040
C          STAR2050
C          STAR2060
C          STAR2070
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C          STAR2100
C          STAR2110
C          STAR2120
C          STAR2130
C          STAR2140
C          STAR2150
C          STAR2160

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CLP=XWG(115)
CNB0=XWG(16)
CNBCL=XWG(17)
CNRCL=XWG(18)
CNRCJ=XWG(19)*DTR
CNPCL=XWG(20)
CNPCD=XWG(21)
WRITE (6,101) (HEAD(I,5),I=1,4),XEL,YEL

C          CALCULATE CONSTANTS FOR ELEVATOR - SEE INPUT FORMAT GUIDE FOR
C          DESCRIPTION OF CONSTANTS.                                         STAR2170
STAR2180
STAR2190
STAR2200
STAR2210
STAR2220
STAR2230
STAR2240
STAR2250
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STAR2670
STAR2680
STAR2690
STAR2700

101      OEL=0*XEL(1)
          XAEL=STACG-XEL(2)*R12
          YAEL=XEL(3)*R12-BLCG
          ZAEL=WLCG-XEL(4)*R12
          ALGFZ=XEL(5)*OTR
          PMREL=XEL(6)
          VENTER=XEL(9)*1.6878
          VMAXE=XEL(10)*1.6878
          PWGELI=XEL(11)*DTR
          WRITE (6,101) (HFAD(I,6),I=1,4),XFN,YFN

C          CALCULATE CONSTANTS FOR FIN/RUDDER - SEE INPUT FORMAT GUIDE FOR
C          DESCRIPTION OF CONSTANTS.                                         STAR2170
STAR2180
STAR2190
STAR2200
STAR2210
STAR2220
STAR2230
STAR2240
STAR2250
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STAR2270
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STAR2680
STAR2690
STAR2700

102      CFIN=0*XFN(1)
          XAFIN=STACG-XFN(2)*R12
          YAFIN=XFN(3)*R12-BLCG
          ZAFIN=WLCG-XFN(4)*R12
          ALGF=XFN(5)*OTR
          PTRFN=XFN(6)
          FNSMC=1,-XFN(7)
          WPIFE (6,101) (HEAD(I,7),I=1,4),XJET

C          CALCULATE CONSTANTS FOR JET - SEE INPUT FORMAT GUIDE FOR
C          DESCRIPTION OF CONSTANTS.                                         STAR2170
STAR2180
STAR2190
STAR2200
STAR2210
STAR2220
STAR2230
STAR2240
STAR2250
STAR2260
STAR2270
STAR2280
STAR2290
STAR2300
STAR2310
STAR2320
STAR2330
STAR2340
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STAR2430
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STAR2460
STAR2470
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STAR2500
STAR2510
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STAR2570
STAR2580
STAR2590
STAR2600
STAR2610
STAR2620
STAR2630
STAR2640
STAR2650
STAR2660
STAR2670
STAR2680
STAR2690
STAR2700

103      NJET=XJET(1)
          TAXR=XJET(2)
          TAXL=XJET(3)
          XAJET=STACG-XJET(4)*R12
          YAJET=XJET(5)*R12-BLCG
          ZAJET=WLCG-XJET(6)*R12
          AVBJET=XJET(8)*OTR
          APBJET=XJET(9)*OTR
          WRITE (6,101) (HFAD(I,8),I=1,4),XGW

C          CALCULATE CONSTANTS FOR BODY/EIGHT - SEE INPUT FORMAT GUIDE FOR
C          DESCRIPTION OF CONSTANTS.                                         STAR2170
STAR2180
STAR2190
STAR2200
STAR2210
STAR2220
STAR2230
STAR2240
STAR2250
STAR2260
STAR2270
STAR2280
STAR2290
STAR2300
STAR2310
STAR2320
STAR2330
STAR2340
STAR2350
STAR2360
STAR2370
STAR2380
STAR2390
STAR2400
STAR2410
STAR2420
STAR2430
STAR2440
STAR2450
STAR2460
STAR2470
STAR2480
STAR2490
STAR2500
STAR2510
STAR2520
STAR2530
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STAR2550
STAR2560
STAR2570
STAR2580
STAR2590
STAR2600
STAR2610
STAR2620
STAR2630
STAR2640
STAR2650
STAR2660
STAR2670
STAR2680
STAR2690
STAR2700

104      IF(XBW(11).EQ.0.) GO TO 12
          21=XBW(16)/XBW(18)
          22=R1*XBW(19)/XBW(20)

```

```

93=R2*XBMW(21)
TMI=XBMW(9)*XBMW(117)
TM=(TMI+R3*XBMW(11))*R12
T1=XBMW(4)+R13*2*XBMW(5)+R2**2*XBMW(6)+TMI*XBMW(17)+R3*XBMW(11)
1 XBMW(16)**2*XBMW(8)+(R1*XBMW(19)*R3**2*XBMW(11))
CPRFLD=XBMW(7)
CF=386.*4*XBMW(15)**2/T1
3MTC=XBMW(3)*CF
9WTK=XBMW(2)*CF
RWTM=R3*XBMW(11)*DTR*TMI/T1*12.
RWTF=SORTBWTK/TWNP1
WRITE(6,13) 9WTF
13 FORMAT(1HO,10X,'BOB WEIGHT FREQUENCY = ',G12.5,' CPS')
GO TO 14
12 RWTG=0.
BWTK=0.
BWTM=0.
CPRELD=0.
14 CONTINUE
14 WRITE(6,101) (MEAD(11,9),I=1,4),XCON
CALL COM1(XCON,D3BLE,TRIML,COMJET,EIMAST,PCCED,PCCMAX)
WRITE(6,101) (MEAD(11,10),I=1,4),XFC,XGN
XO=XFC(1)*1.6878
YD=XFC(2)*1.6878
ZD=-XFC(3)
ZZ=-XFC(4)
IALFS=IALF
IALF=XIT(15)
KVAR(5)=6
KVAR(6)=7
IF((IALF.LT.1.OR.(IALF.GT.2)) IALF=1
IFI IALF.EQ.2) KVAR(6)=5
IFI GUESS.EQ.2..AND. IALF.EQ.2..AND. IALFS.EQ.1) GO TO 16
AYE=XFC(5)*DTR
ARE=XFC(7)*DTR
18 CONTINUE
IFI GUESS.EQ.2.) GO TO 15
APF=XFC(6)*DTR
COLSTK=XFC(8)
CYSTK1=XFC(9)
CYSTK2=XFC(10)
PEAL=XFC(11)
A1M=XFC(15)*DTR
B1M=XFC(16)*DTR
A1TR=XFC(17)*DTR
31T9=XFC(18)*DTT.
THRUST(1)=XFC(19)
THRUST(2)=XFC(20)
GUESS=XFC(22)
15 CONTINUE
CALL WRVP1(HEAD1,IALF)
ENGRPM=XFC(21)
QMAX=100000.
IFI(OMECH.NE.0..AND.XFC(26).NE.0..) QMAX=XFC(26)*500./OMECH

```

```

VSND=1 //XFC(27)
XAGUN=STACG-XGN(1)*R12
YAGUN=XGM(2)*R12-BLCG
ZAGUN=WLCG-XGN(3)*R12
AYBG=XGN(4)*DTR
APBG=XGN(5)*DTR
WRITE (6,101) (HEAD(I,11),I=1,4),XER
C
C CALCULATE ALLOWABLE ERRORS.
C
FRR(1)=XER(1)
FRR(2)=XER(2)
ERR(3)=XER(3)
ERR(4)=XER(4)
FRR(5)=XER(4)
ERR(6)=XER(5)
ERR(7)=XER(6)
ERR(8)=XER(6)
ERR(9)=XEP(7)
ERR(10)=XER(7)
ERM=XER(6)
ERTR=XER(7)
WRITE (6,101) (HEAD(I,12),I=1,4),XIT
MXPASS=XIT(1)
ITEM=XIT(2)
EPOS=XIT(4)/10.
COND1=XIT(5)
COND2=XIT(6)
FVIND=XIT(7)
XLMINM=XIT(8)*DTR
XLMINT=XIT(9)*DTR
FRXM=XIT(10)
FRXT=XIT(11)
XLIMIT=2.*DTR*XIT(12)
XMIN=XIT(13)*DTR
DAMP=XIT(14)
IF(FVIND.LL.C.) FVIND=-5
WRITE (6,101) (HEAD(I,13),I=1,4),TSTA8
WRITE (6,101) (HEAD(I,14),I=1,4),TAIR
C
C CALCULATE CONSTANTS FOR SUBROUTINE CLCD.
C
CALL YFIX (YMR,YAERO)
CALL MNEM
RETURN
100 FORMAT (1HO//1H '61X,'INPUT DATA'/')
101 FORMAT (1HO.55X,4A4, GROUP //1H '3X,7G18.7')
END

```

```

SUBROUTINE SWAS1 ( KLI )
COMMON /MANAL/ Q,AP,PED,QMG,T1M,T2M,
                T1T,T1T,T2T,ALFL,CZET,PSD0,
                SZET,TAXL,TAXR,XANG,XLNK(16),ZANG,
                ALCVP,ALFIN,ALLNG,ALRG,CFDELE,CFIN,
                CDFMG,CDMG,CLELE,CLFIN,CLLGNG,CLRGNG,CWING,
                CYCRL,CYCR2,CZET4,CZET6,CZET9,RANGE,
                SZETS,SZET7,SZET8,WGCOL,XAELE,XAFIN,
                XAFUS,XAJET,YAFIN,ZAELLE,ZAFIN,ZAFUS,
                YAELLE,YAFUS,YALMG,YARWG,YALJET,YARJET,
                ZAJET,ALECR1,ALGFPO,BOTTOM,CZET11,
                CZET12,CZET13,EIZETA,HALFPI,SZET10,
                XAPYLD,YGUSIW,ZAPYD,ZFLWGI,ZFRWGI,
                *T2MS,T1MS,T2MS,T1TS,T1TS,T2TS,
                CLOCK,FLOCK,XLOCK,TCLOCK
C KONFIG=KL
C RETURN
C ENTRY SWAS (COLSTK)
C
C      BOTTOM = RAD
C      RANGE = RAD/PERCENT
C
C      SINGLE ROTOR CONTROLS
C      TZMR=COLSTK*ORANGE+BOTTOM
C      T1MR=CYCR1*CZET
C      T2MR=CYCR2*CZET
C      IF(KONFIG.EQ.-1) GO TO 105
C      TZTR=XLNK(1)+XLNK(2)*PED*XLNK(3)*PED**3
C      T1TR=0.
C      T2TR=0.
C      30 TO 102
C      105 T1TR=T1MR*XLNK(1)
C          T2TR=T2MR*XLNK(2)
C          TZTR=TZMR*XLNK(3)
C          IF(KONFIG.EQ.3) GO TO 104
C          TANDEM CONTROLS
C          TZTR=TZTR+XLNK(4)*T1MR
C          TZMR=TZMR+XLNK(5)*T1MR
C          TZTR=TZTR+XLNK(6)*PED
C          TZMR=TZMR+XLNK(7)*PED
C          GO TO 102
C          SIDE-BY-SIDE CONTROLS
C          EXAMPLE- SZET9=XLNK(9)*SIN(F(ZETA))
C          104 TZTR=TZTR+CYCR2*CZET4*PED*SZET5
C              TZMR=CYCR2*CZET6*PED*SZET7
C              TZTR=TITR+CYCR2*SZET8*PED*CZET7
C              TZMR=TITR+CYCR2*SZET10*PED*CZET11
C              CHECK CONTROL LOCKS
C          102 IF(CLOCK.EQ.0.) GO TO 99
C              TZM=TZMS
C              GO TO 98
C              99 TZM=TZMR
C              99 IF(FLOCK.EQ.0.) GO TO 97

```

```

TIM=TIMS
T1T=T1TS
GO TO 100
97
TIM=TIMER
T1T=T1TR
IF(XLOCK.NE.0.) GO TO 101
T2M=T2MR
T2T=T2TR
GO TO 107
101
IF(XLOCK.LT.1.5) GO TO 96
T2M=T2MS+CYCR1+CZET12
T2T=T2TS+CYCR1+CZET13
GO TO 107
96
T2M=T2MS
T2T=T2TS
107
IF(TCLOCK.EQ.0.) GO TO 95
T2T=T2TS
RETURN
95
T2T=T2TR
RETURN
FND

```

```

SWAS0550
SWAS0560
SWAS0570
SWAS0580
SWAS0590
SWAS0600
SWAS0610
SWAS0620
SWAS0630
SWAS0640
SWAS0650
SWAS0660
SWAS0670
SWAS0680
SWAS0690
SWAS0700
SWAS0710
SWAS0720
SWAS0730
SWAS0740
SWAS0750

```

SUBROUTINE TABINT (CL,CD,X,Z,SG)

X = XMAC

Z = ALD

```
C
C
C
C
COMMON /TAB/ CURVEL(1209),CURVED(857),K(11),L(17)
DIMENSION CL(12)
NX=9
NZ=20
N=10.*X+1.
IF(N.GT.11) N=11
KM=K(IN)
DO 30 I=KM,NX
  IF(X.GE.CURVEL(I)) GO TO 30
  KX=I
  IF(I.EQ.1) KX=2
  GO TO 32
30 CONTINUE
  KX=NX
3? XL=CURVEL(KX-1)
  XM=(X-XL)/(CURVEL(KX)-XL)
  XM1=1.-XM
  M=NZ+NX
  N=Z+1.
  IF(N.GT.17) N=17
  KA=L(IN)
  J=NX+KA
  DO 70 I=J,M
    IF(Z.GE.CURVEL(I)) GO TO 70
    KZ=I
    IF(I.EQ.(NX+1)) KZ=NX+2
    GO TO 72
70 CONTINUE
  KZ=M
7? ZL=CURVEL(KZ-1)
  J=(KZ-NX-2)*NX+KX+NZ
  DO 75 I=1,2
    J=J+NX
    CL(I)=CURVEL(J-1)*XM+CURVEL(J)*XM
75 CONTINUE
  CL=CL(1)+(Z-ZL)/(CURVEL(KZ)-ZL)*(CL(2)-CL(1))
  NX=12
  N=65
  Z=Z*SG
  DO 40 I=KM,NX
    IF(X.GE.CURVED(I)) GO TO 40
    KX=I
    IF(I.EQ.1) KX=2
    GO TO 42
40 CONTINUE
  KX=NX
4? XL=CURVEL(KX-1)
  XM=(X-XL)/(CURVEL(KX)-XL)
  XM1=1.-XM
TAB10010
TAB10020
TAB10030
TAB10040
TAB10050
TAB10060
TAB10070
TAB10080
TAB10090
TAB10100
TAB10110
TAB10120
TAB10130
TAB10140
TAB10150
TAB10160
TAB10170
TAB10180
TAB10190
TAB10200
TAB10210
TAB10220
TAB10230
TAB10240
TAB10250
TAB10260
TAB10270
TAB10280
TAB10290
TAB10300
TAB10310
TAB10320
TAB10330
TAB10340
TAB10350
TAB10360
TAB10370
TAB10380
TAB10390
TAB10400
TAB10410
TAB10420
TAB10430
TAB10440
TAB10450
TAB10460
TAB10470
TAB10480
TAB10490
TAB10500
TAB10510
TAB10520
TAB10530
TAB10540
```

```

M=NZ+NX
KA=33.+Z
IF( KA.LT.-17) KA=-1
IF( KA.GT.49) KA=49
J=NK+KA
DO 60 I=J,M
IF( Z.GE.CURVED(I)) GO TO 60
KZ=1
IF( I.EQ.(NX+1)) KZ=NX+2
GO TO 62
60 CONTINUE
KZ=M
62 ZL=CURVED(KZ-1)
J=(KZ-NX-2)*NX+XX+NZ
DO 65 I=1,2
J=J+NX
CLO(I)=CURVED(J-1)*XM1+CURVED(J)*XM
65 CONTINUE
CD=CLO(1)*(Z-ZL)/(CURVED(KZ)-ZL)*(CLO(2)-CLO(1))
RETURN
END

```

SUBROUTINE TILT1 (KL)
 COMMON /STAMAN/ HL(2),XX,YY,AY1,GOV,KPD,QPC,QQQ,
 RTY,APBG,ARBG,ASEP,AYBG,BMTC.
 1 RC,BWTK,BWTK,CGL,CGL,OPIX,OPIZ.
 2 FHT(2),R550,ALERT,AYDMX,DELT2,
 DPIXZ,DWBNT,DMLCG,MDLT,HGUST,
 HLTR1,HLTR2,ITORS,KTCCTR,OMEGM,
 PCOEL,QMRS,A,RMASS,STRAL,TWOP1,VGUST,
 ISTOP,XAGUM,XAPYL,XARSP(2),YAGUN,
 3 YARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
 4 OET2R,OSTACC,EIMAST,GPRELD,HLPYLO,
 5 TBRAKE,OMEGMO,QBRAKE,BETAZ(2),
 6 PCGDED,PCGMAX,PCRATE,P01DIR,RDELT1,
 RDELT2,ITORS,TRIND2
 7 Q,AP,PED,QWG,T2M,T1M,T2M,
 8 T1T,T2T,ALEL,CZET,PSOD,
 9 SZET,TAXL,TAXR,XAMG,XLMK(16),ZAMG,
 A ALCYP,ALFIN,ALLWG,ALRWG,CDLE,CDFIN,
 B CDLNG,CDRWG,CLELE,CLFIN,CLLWG,CLRWG,CWING,
 C CYCR1,CYCR2,CZET4,CZET6,CZET9,RANGE,
 D SZET5,SZET7,SZET8,NGCOL,XAEL,XAFIN,
 E XAFUS,XAJET,YAFIN,ZAEL,ZAFIN,ZAFUS,
 F YAEL,XAFUS,YALWG,YARWG,YALJET,YARJET,
 G ZAET,ALECR1,ALGFPO,BOTTOM,CZET11,
 H CZET12,CZET13,EIZETA,HALFPI,SZET10,
 I XAPYLD,YGUSTW,ZAPYLD,ZFLWGL,ZFRWGL
 J T2MS,TIMS,T2MS,TZS,TITS,T2TS,
 K CLOCK,FLCK,XLOCK,TCLOCK
 L DIMENSION XAR(2),YAR(2),ZARI(2),COLL(6),DPSI(12,2),NPSI(2),
 M BETAZ(2),PSIREF(2)

COMMON /MANAL/
 1 KONFIG=KL
 2 DSTCGT=0,
 3 DSTCGH=D,
 4 DBLCG=0,
 5 DSTACG=0,
 6 DMLCG=0,
 7 RETURN
 8 ENTRY TILT (XAR,ZAR,CGML,COLL,ZETA,CGSTA)
 9 SZET=SIM(ZETA)
 A CZET=COS(ZETA)
 B CZETM1=1,-CZET
 C XA=ZAPYL*SZET+XAPYL*CZETM1-DSTACG
 D ZA=ZAPYL*SZETM1-XAPYL*SZET-DMLCG
 E DSTACG=XA+DSTACG
 F DMLCG=ZA+DMLCG
 G ZAFUS=ZAFUS*ZA
 H ZARSP(1)=ZARSP(1)+ZA
 I ZARSP(2)=ZARSP(2)+ZA
 J ZARI(1)=ZARI(1)-HL(1)*CZET
 K ZAGUM=ZAGUM+ZA
 L ZAFIN=ZAFIN+ZA
 M ZAELE=ZAELE+ZA
 N ZAMG=ZAMG+ZA
 O ZAJET=ZAJET+ZA

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```

ZAPYLD=ZARSP(1)-HLPYLD+CZET
CGWL=CGWL+ZA*12.
RANGE=(COLL(6)*ZETA+COLL(5))*POIOTR
BOTTOM=COLL(2)+ZETA*(COLL(3)+ZETA*COLL(4))
CZET12=XLNK(12)*CZET
CZET13=XLNK(13)*CZET
EZETA=FIMAST*ZETA
IFI1KONFIG.NE.3) GO TO 100
CX26=COS(XLNK(14)*ZETA)
SPEED2=SIN(XLNK(15)*ZETA+XLNK(16))
CZET4=XLNK(4)*CX26
SZE75=XLNK(5)*SPEED2
CZET6=XLNK(6)*CX26
SZE77=XLNK(7)*SPEED2
SZE78=XLNK(8)*SZE7
CZET9=XLNK(9)*CZET
SZE710=XLNK(10)*SZE7
CZET11=XLNK(11)*CZET
GO TO 100
ENTRY HSAF (XAR,YAR,DPSI,MPSI,CGSTA,PSIREF)
NPSI1 = NPSI(1)
SUMCOS = 0.
SUMSIN = 0.
DO 10 I=1,NPSI1
  ARG = PSIREF(I) + DPSI(I,1)
  SUMCOS = SUMCOS + COS(ARG)
  SUMSIN = SUMSIN + SIN(ARG)
10 CONTINUE
XA=RC*SUMCOS-DSTCGH
YA=-RC*SUMSIN-DRLG
NSTCGH = YA + DSTCGH
DBLCG = YA + DBLCG
YAFUS = YAFUS + YA
YARSP(1) = YARSP(1) + YA
YARSP(2) = YARSP(2) + YA
YAR(1) = YARSP(1)
YAR(2)=YARSP(2)
YAR(2)=YAR(2)+XA
YAGUN = YAGUN + YA
YAFIN = YAFIN + YA
Y AFLF = Y AFLF + YA
YALWG = YALWG + YA
YARWNG = YARWNG + YA
YALJET = YALJET + YA
YARJET = YARJET + YA
CGBL=CGBL+YA*12.
GO TO 100
ENTRY TFFA (XAR,BETAZ,CGSTA)
XA=-RC*SZET*SIN(BETAZ(1))-DSTCGT
DSTCGT = YA + DSTCGT
100 CONTINUE
XAFUS=XAFUS+XA
XARSP(1)=XARSP(1)+XA
XARSP(2)=XARSP(2)+XA

```

```
XAR(1)=XARSP(1)+HL(1)*SZFT
XAGUN=XAGUN+XA
XAFIN=XAFIN+XA
XAELF=XAELF+XA
XAWG=XAWG+XA
XAJET=XAJET+XA
XAPYLD=XARSP(1)+HLPVLD*SZFT
CGSTA=CGSTA+XA*12.
RETURN
END
```

```
TILT1090
TILT1100
TILT1110
TILT1120
TILT1130
TILT1140
TILT1150
TILT1160
TILT1170
TILT1180
```

```

SUBROUTINE TINIT (TAIR)
COMMON /STRINA/ AY,VH,AGW,DT1(2),DT2(2),IXZ,
1   QMR,XXD,YYD,ZZD,ALGF,APFP,AYFP,
2   CGWL,CGLL(6),CYCF(3),CYCL(3),
3   DIST,KCIT(20),PEDA(3),QMAX,
4   QMRS,TIME,TMAX,XCIT(20,6),ALGEZ,
5   ALGE1,ALGE2,CGSTA,CPMIC,DIXIZ,
6   DIXIX,DIZIY,DIZMT,DIZML,DIZTI,FTKTS,
7   HUBKM(2,2),HUBKI(2,2),
8   KREAD,PIU30,TSTAB(14),ZMAX2,ZMAX3,
9   ASECOL,CYPMIC,GEARAT,PSD550,
10  PSISTP,QXBRAK,RUDIND,ZDELT1,ZDELT2
11  HL(12),XX,YY,AY1,GOV,KPD,OPC,QQQ,
12  RTY,APBG,ARBG,ASEP,AYB6,BWTc,
13  RC,BWTk,BWTH,CGBL,DPIX,DP1Z,
14  FHPPT(2),R5SD,ALERT,AYOMX,DELT2,
15  DPIXZ,DBWT,DWLCG,HDelt,HGUST,
16  HLTR1,HLTR2,ITORS,KTCTR,OMEGM,
17  PCDEL,QMRSa,RMASS,TRALT,TWOP1,VGUST,
18  ISTOP,XAGUN,XAPYL,XARSPI(2),YAGUN,
19  YARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
20  DELT2R,OSTACG,EIMAST,GPREDL,HLPYLD,
21  IBRAKE,OMEGMD,OBRAKE,BETAS(2),
22  PCGDED,PGMAX,PCRATE,POIDTR,RDELT1,
23  RDELT2,RITORS,TRIND2
24  DIMENSION TAIR(14)
25  ARBG=0,
26  ASECOL=0,
27  AYOMX=0,
28  DTZMT=0,
29  DTZMI=0,
30  DTZTI=0,
31  DTI(1)=0,
32  DTI(2)=0,
33  DT2(1)=0,
34  DT2(2)=0,
35  DTBMT=0,
36  HGUST=0,
37  ISTOP=0
38  IBRAKE=1
39  KPD=0
40  VGUST=C,
41  ALERT=0,
42  ASEP=0,
43  KTCTR = 0
44  OMEGMD=D,
45  PCDEL=0,
46  PCRATE=0,
47  QOC=2,
48  RITORS=0,
49  FTMTS=,5925
50  $50=,181810101AE-02
51  YGUST=0,
52  QMRSa=QMAX
53  TINI0010
54  TINI0020
55  TINI0030
56  TINI0040
57  TINI0050
58  TINI0060
59  TINI0070
60  TINI0080
61  TINI0090
62  TINI0100
63  TINI0110
64  TINI0120
65  TINI0130
66  TINI0140
67  TINI0150
68  TINI0160
69  TINI0170
70  TINI0180
71  TINI0190
72  TINI0200
73  TINI0210
74  TINI0220
75  TINI0230
76  TINI0240
77  TINI0250
78  TINI0260
79  TINI0270
80  TINI0280
81  TINI0290
82  TINI0300
83  TINI0310
84  TINI0320
85  TINI0330
86  TINI0340
87  TINI0350
88  TINI0360
89  TINI0370
90  TINI0380
91  TINI0390
92  TINI0400
93  TINI0410
94  TINI0420
95  TINI0430
96  TINI0440
97  TINI0450
98  TINI0460
99  TINI0470
100 TINI0480
101 TINI0490
102 TINI0500
103 TINI0510
104 TINI0520
105 TINI0530
106 TINI0540

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```
HLTR2=HL(2)*TRIND2
VH=SQRT(XXD**2+YYD**2)
AYFP=0.
APFP=0.
IF(VH.NE.0.) AYFP=ATAN2(YYD,XXD)
IF(VH.NE.0..OR.ZZD.NE.0.) APFP=ATAN2(-ZZD,VH)
TRALI=100*TRIN02
DO 45 I=2,14
IF(TSTAB(I).EQ.0.) TSTAB(I)=9999.
IF(TAIR(I).EQ.0.) TAIR(I)=9999.
45 CONTINUE
RETURN
END
```

```
TINI0550
TINI0560
TINI0570
TINI0580
TINI0590
TINI0600
TINI0610
TINI0620
TINI0630
TINI0640
TINI0650
TINI0660
TINI0670
```

SUBROUTINE TRIM
 COMMON /FORCE/ XF•XFRWG•XFING•XFFUS•XFRJET.
 XFLJET•XFMR•XFTR•XFGUN•XFFIN•XFW.
 YF•YFFUS•YFRJET•YFLJET•YFMR•YFTR.
 YFGUN•YFFIN•YFW.
 ZF•ZFRWG•ZFING•ZFELE•ZFFUS•ZFRJET.
 ZFLJET•ZFMR•ZFTR•ZFGUN•ZFW.
 QL•LRNG•LLNG•LELE•LFUS•LRJET•LLJET.
 LMR•LTR•LGUN•LFIN•LQMR•LQTR.
 OM•MRNG•MLNG•MELF•MFUS•MRJET•MLJET.
 MNR•MTR•MGUN•MFIN•MQMR•MQTR.
 OM•MRNG•MLNG•MELE•MFUS•MRJET•MLJET.
 NMR•NTR•NGUN•NFIN•NQMR•NQTR.
 NMN•NTR•NGUN•NFIN•NQMR•NQTR
 COMMON /STRIAB/ D(21)•DT(21)•E(79)•F(10)•X(10)•
 DL•DM•DN•DX•DY•DZ•IX•IV•IZ•PD(10,11).
 OTR•EPD•ERR(10)•KMI•RHO.
 R12•SPD(6•6•3)•XBW(21)•XEL(14).
 XER(7)•XFC(28)•XFN(7)•XFS(35).
 XGN(7)•XIT(21)•XMR(49)•XTR(49).
 XWG(21)•YMR(21)•YTR(21)•YWG(21).
 YEL(21)•YFN(21)•BLCG•DAMP•DEPD(10).
 EPDS•EPDX(10)•MASS•QSVL•TMRS•TTRS.
 WLCG•XCON(63)•XJET(14)•XMIN•AYEF.
 BETAES(12)•CNPCD•DHAD•DYBD•GUESS.
 NPASS•PDPHI(10,11)•STACG•TZERD.
 XMAS•DHADAQ•QDDCDL•DTRRSQ•DYBOBR.
 ENGRPM•MXPASS•PSD30P•TRIND1•XLIMIT
 COMMON /STRIMMA/ AY•VH•AGW•DT1(2)•DT2(2)•IX2.
 QMR•XXD•YYD•ZZD•ALGF•APFP•AYFP.
 CGWL•COLL(6)•CYCF(3)•CYCL(3).
 DIST•KCIT(20)•PEOA(3)•OMAX.
 QMR•TIME•TMAX•XCIT(20,6)•ALGE2.
 ALGE1•ALGE2•CGSTA•CPWIC•OIXIZ.
 DIVIX•DIZIV•DTZMT•DTZM1•OTZT1•FTKTS.
 HUBK(2,21)•HUBK(2,2).
 KREAD•PIU30•TSTAB(14)•ZMAX2•ZMAX3.
 ASECOL•CYPWIC•GEARAT•PS0550.
 PS1•STP•QXBRAK•RUDIND•ZDELT1•ZDELT2
 Q•AP•PED•QMG•TZM•TIM•T2M.
 TZT•T1T•T2T•AEL•CZET•PSDD.
 SZET•TAXL•TAXR•XAMG•XLMK(16)•ZAMG.
 ALCY•ALFIN•ALLWG•ALRWG•CDELE•CDFIN.
 COLWG•CDRWG•CLELE•CLFIN•CLRWG•CLWING.
 CYCRL•CYCR2•CZET4•CZET6•CZET9•RANGE.
 SZETS•SZET7•SZET8•MGCOL•XAELE•XAFTN.
 XAFUS•XAJET•YAFIN•ZAELE•ZAFIN•ZAFUS.
 YAEL•YAFUS•YALWG•YARWG•YALJET•YARJET.
 ZAJET•ALECRL•ALGFDP•BDTTOM•CZET11.
 CZET12•CZET13•EIZETA•HALFPI•S2ET10.
 XAPYLD•YGUSTW•ZAPYLD•ZFLNG1•ZFRWG1
 ,TZMS•TIMS•T2MS•T2TS•TITS•T2TS.
 CLOCK•FLOCK•XLCK•TCLOCK
 ZZ•VXS(2)•VYS(2)•VZS(2)•BETA(12•2).
 T•PCC(2)•CDSE(7•7•2)•BETAN(2)•BETAZ(2).
 * COMMON /ROMAN/
 *

```

* 1 A18(12),AP00,AR00,AY00,AIR(2),
  OPS1(12,2),OPTR,MPS1(2),ZZTR,
  BETAD(12,2),BNPS1(2),
  ? COND2,GMAXV,RATE1, RATE2,STOP2,
  3 THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
  4 GMAXV2,GMAXV3,GUSTYP,HNPSSR(2),
  5 HUBKPS,HUBTRS,HUBTPS,HUBTRS,
  6 KONFIG,LNGTH1,PILGH1,PSIREF(2),
  7 START2,XMON(1(12,2),
  8 RM,RTR,DRM,DRTR,TIM1,TIM1,
  9 T2M1,T2T1,T2M1,T2T1,XMA1,XMA1,
  A XN01,XMB1,AIBPM,AIBPT,AIBRM,AIBRT,
  B APTD,APTD,ARTD,ARTD,PSD,PSD,
  C XSTA1M,XSTA1M,YSTA1M,YSTA1M,
  D HUBKP,HUBKTP,HUBKR,HUBKTR
  E F COMMON /MANARO/
  *AZETA,AZETAT,VZETA,VZFTAT
  1 *V,INO,INAG,APBMT,ARBMT,AYBMT,BETAD(2),TDELT,
  2 BETAE(2),MGUSTE,MGUSTF,MGUSTW,MGUSTE,
  3 VGUSTH,YGUSTF,GFMD,GLAT,GVERT,
  4 VX0,VZB,APD,VY0,ARD,AYD,
  5 COLSTK,CYSTK1,CYSTK2,PEOAL,AYE,
  6 APE,ARE,AIM,BIN,AIR,DIR,DIR,
  7 XAR(2),YAR(2),ZAR(2),
  8 VIMR,VITR,ZETA,ZETAT,HMR,HTR,
  TMR,TTR,QMX,QTR,YMF,YTRF
  COMMON /STANRO/ J,W,I1H,VHS(2),LINK,QEL,E,VROT(2),
  1 VSM0,YFIN(2),ZFEL(2),AIBAL(2),
  2 D1BAL(2),CDMD1,SWING,PILGH2,PMGEL1,
  3 DM,BTR,PMOMM,PMOMT,PMOMM,PMOMT
  COMMON /TOPLOT/ AH(13),AL(3),EXIT,ICOM(49),IPSN,
  1 NPART,NVARA,NVARB,NVARC,NSCALE
  *NVARS,NPRINT,NTIME
  1 COMMON /FORY/
  DIMENSION VAR(11),HEAO2(6,7),PSID(2),APDR(2),
  EQUIVALENCE (VAR(1)),COLSTK,(PSID(1),PSD1),(APDR(1),APTD),
  1 (ARD(1),ARD1)
  DATA HEAD2/******COLLECTIVE STICK *****/A CYCLIC STICK *****
  1 *LAT CYCLIC STICK *****/PEDAL POSITION EXCEEDS STOPS (TRIMD920
  2 PERCENT FULL THROW COMPUTED)
  LOGICAL AYEFP
  REAL MASS,IXZ
  AYEFP=.TRUE.
  IF(LABS(AYE-AYFP).LE..01.AND.Y(1,85).EQ.0.) AYEFP=.FALSE.
  LPASS=5
  IF(XXT(3).EQ.0.) LPASS=1
  EPDX(1)=1./RANGE
  FPDX(2)=1./CYCF(3)
  EPDX(3)=1./CYCL(3)
  EPDX(4)=1./PEDA(3)
  C EPDX IS IN UNITS OF PERCENT PER RADIAN
  DX=0,
  DY=0,
  DZ=0,
  DL=0,
  TRIM0550
  TRIM0560
  TRIM0570
  TRIM0580
  TRIM0590
  TRIM0600
  TRIM0610
  TRIM0620
  TRIM0630
  TRIM0640
  TRIM0650
  TRIM0660
  TRIM0670
  TRIM0680
  TRIM0690
  TRIM0700
  TRIM0710
  TRIM0720
  TRIM0730
  TRIM0740
  TRIM0750
  TRIM0760
  TRIM0770
  TRIM0780
  TRIM0790
  TRIM0800
  TRIM0810
  TRIM0820
  TRIM0830
  TRIM0840
  TRIM0850
  TRIM0860
  TRIM0870
  TRIM0880
  TRIM0890
  TRIM0900
  TRIM0910
  TRIM0920
  TRIM0930
  TRIM0940
  TRIM0950
  TRIM0960
  TRIM0970
  TRIM0980
  TRIM0990
  TRIM1000
  TRIM1010
  TRIM1020
  TRIM1030
  TRIM1040
  TRIM1050
  TRIM1060
  TRIM1070
  TRIM1080

```

```

DM=0.
DN=0.
BETAES(1)=BETAE(1)
BETAES(2)=BETAE(2)
TMR=TMR
TTR=TTR
DO 4 I=5,10
EPDX(I)=1.
4 CONTINUE
CALL DAMPER
CALL PDZ1 (KOMFIG)
DO 6 K=1,10
X(K)=0.
DO 6 L=1,11
PD(K,L)=0.
POPHI(K,L)=0.
6 CONTINUE
LINK=2
CALL INTRIM(LPASS)
DO 175 I=1,4
IF((VAR(I).GE.0.0.AND.VAR(I).LE.100.) GO TO 175
WRITE (6,176) (HEAD2(J,I),J=1,6),(HEAD2(J,5),J=1,6),VAR(I).
1 (HEAD2(J,K),J=1,6),K=6,7)
EXIT=1.
175 CONTINUE
DL=0.
DM=0.
ON=0.
DX=0.
DY=0.
DZ=0.
IF(INPART.NE.2.OR.EXIT.NE.0.) RETURN
IND=0
Y(1, 1)=VXB
Y(1, 2)=VYB
Y(1, 3)=VZB
Y(1,4)=AYD
Y(1,5)=APD
Y(1,6)=ARD
Y(1,10)=AYE
Y(1,11)=APE
Y(1,12)=ARE
NPSI(1)=BN
NPSI(2)=BTR
CALL NPSI1 (NPSI1,NNPST1,BNPSI1,DPSI1)
TDELT = 20ELT1
TIME= TZERD- 95*TDELT
DIST= TZERO*V
AY=0.
IF(VXB.NE.0.0.OR. VYA.NE.0.) AY=ATAN2(-VYB,VXB)
DMR=DMX+OTR*GEARAT
OMRS=DM
CALL IV: (EXIT,LINK,TAXL,TAXR,PILGM2,A1M,B1M,A1TR,B1TR)
ZFEL11)=2FELE

```

```
YFIN(1)=YFFIN
REWIND 3
ITM=0
RETURN
176 FORMAT (1HO,12A4,F7.1,12A4)
END
```

```
TRIM1630
TRIM1640
TRIM1650
TRIM1660
TRIM1670
TRIM1680
```

```

SUBROUTINE TURN (XFC,V,ARE)
COMMON /FORY/ Y(4,150)
DIMENSION XFC(28)
DATA G/32.17/,DTR/.1745329E-01/
Y(2,86)=1.
IF(XFC(21).NE.0.) GO TO 5
DO 100 I=12,14
IF(XFC(I).EQ.0.) GO TO 100
J=I-11
30 TO (1,2,3),J
100 CONTINUE
RETURN
1 CONTINUE
GLEVEL=XFC(112)
IF(GLEVEL.LE.1.) GO TO 5
ARE=ARCOS(1./GLEVEL)
ARED=ARE/DTR
TRAD=V**2/(V*TAN(ARE))
GO TO 4
? CONTINUE
ARED=XFC(113)
ARE=AKED*DTR
GLEVEL=1./COS(ARE)
TRAN=V**2/(G*TAN(ARE))
GO TO 4
2 CONTINUE
TRAD=XFC(114)
ARE=ATAN2(V**2,G*TRAD)
ARED=ARE/DTR
GLEVEL=1./COS(ARE)
4 CONTINUE
Y(1,85)=V/TRAD
PSID=Y(1,85)/DTR
TURN=360./ABS(PSID)
TRAD=ABS(TRAD)
WRITE (6,170) GLEV,ARED,TRAD,PSID,TURN
RETURN
5 CONTINUE
Y(2,86)=XFC(112)
IF(XFC(17)-1.) 6,7,8
6 CONTINUE
WRITE (6,180) XFC(112)
7 CONTINUE
RETURN
8 WRITE (6,190) XFC(112)
RETURN
170 FORMAT(//: G-LEVEL = 'G12.5.10X.', BANK ANGLE = 'G12.5//',
1, : TURN RADIUS = 'G12.5.10X.', YAW RATE = 'G12.5//',
, TIME USED TO COMPLETE 360 DEGREE TURN = 'G12.5')
1PC FORMAT(//: PUSH-JVER WITH G-LEVEL = 'G12.5,
1QC FORMAT(//: PULL-UP WITH G-LEVEL = 'G12.5)
END

```

SUBROUTINE VARI

```

COMMON /FIRCF/ XF,XFRWC,XFLWG,XFLNG,XFLN,XFLN,XFRJET,
XF,LJET,XFMQ,XFIS,XFIN,XFFIN,XFW,
YF, YFI, US,YFJET,YFI,JET,YFHR,YFTR,
YFGUN,YFFIN,YFW,
ZF,ZFRWG,ZFLWG,ZFFLE,ZFFUS,ZFRJET,
ZFLJET,ZFMR,ZFTQ,ZFGUN,ZFd,
QL,LRWG,LLWG,LELF,LFUS,LRJET,LLJET,
LNR,LTR,LGUN,LFIN,LQMR,LQTR,
QM,MRWG,MLWG,MELF,MFIUS,MRJET,MLJET,
MMR,MTR,PGUN,MFIN,MQMR,MQTR,
QN,NRWG,NLWG,NELF,NFIUS,NRJET,NLJET,
NMR,NTR,NGUN,NFIN,NMFR,NOTR
      COMMON /STRIAB/
     D(21),OT(21),E(79),F(10),X(10),
     DL,DM,ON,DY,OZ,IX,IY,I2,PD(10,11),
     DTR,EPD,ERR(10),KMI,RHO,
     R12,SP0(6,6,3),XAM(21),XEL(14),
     XER(7),XFC(28),XFN(7),XFS(35),
     XGN(7),XIT(21),XMR(49),XTR(49),
     XWG(21),YMR(21),YTR(21),YNG(21),
     YEL(21),YFN(21),BLCG,OMP,DEPD(10),
     EPOS,EPOX(10),MASS,OSVL,TMRS,TTRS,
     WLCG,XCON(63),XJET(14),XMIN,AYEFFP,
     BETAE(2),CNPCO,OMAD0,DYDBR,GUESS,
     NPASS,POPBL(10,11),STACG,T7ERO,
     XMAST,DHAOAQ,DQOCOL,DTRRSQ,DYBDBR,
     ENGRPM,MXPASS,PSD30P,TRIM01,XLIMIT
     AY,VH,AGM,OT1(2),OT2(2),IXZ,
     QMR,XXD,YY,OZN,ALGF,APFP,AYFP,
     CGML,COLL(6),CYCF(3),CYCL(3),
     OIST,KCIT(20),PEDA(3),QMAX,
     QMRS,TIME,TMAX,XC1T(20,6),ALGEZ,
     ALGE1,ALGE2,CGSTA,CPWIC,OIXIZ,
     DIVIX,OIZIY,OT2ZMT,DTZM1,OT2T1,FTKTS,
     HUBK(2,2),HURKI(2,2),
     KREA0,PIU30,TSTAB(14),ZMAX2,ZMAX3,
     ASECOL,CYPWIC,GEARAT,PSD550,
     PS1STP,QXRRAK,RUQIND,ZDELT1,ZDELT2
      COMMON /STAMAN/
     HL(2)XX,YY,AY1,GOV,KPD,OPC,QQQ,
     RIY,APBG,ARBG,ASEP,AYBG,BMTC,
     RC,BMTK,BMTM,CGBL,DPIX,OP12,
     FHPT(2),R550,ALERT,AYDXN,DELT2,
     DP1XZ,DTBWT,DMILCG,HDEL,T,HGUST,
     HLTR1,HLTR2,ITORS,KTCTR,DMEGM,
     PCOEL,QMRS,A,MASS,TRALT,TWOP1,VGUST,
     ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,
     YARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
     DELT2,OSTACG,EIMAST,GPREL0,MLPYLD,
     I BRAKE,DMFGND,OBRAKE,BETAZS(2),
     PCGDE0,PCGMAX,PCRATE,PO10TR,ROELT1,
     RDELT2,RITORS,TRIM02
      COMMON /MANAL/
     Q,AP,PEO,OMG,T2M,T1M,T2N,
     T2T,T1T,T2T,ALEL,CZET,PSDD,
     SZET,TAXL,TAXR,XAMG,XLMK(16),ZANG,
      COMMON /MANAL/
     1
      2

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```

3 ALCYP, ALFIN, ALLWG, ALRMG, CDELE, CDFIN,
4 COLMG, CDRMG, CLELE, CLFIN, CLLMG, CLRNG, CMING.
5 CYCRI, CYCR2, CZET4, CZET6, CZET9, RANGE,
6 SZET7, SZET8, WGCOL, XAELE, XAFIN,
7 XAFUS, XAJET, YAFIN, ZAELE, ZAFIN, ZAFUS.
* * * * *
8 YAELE, YAFLW, YARLG, YARJET, YARJET,
9 ZAJET, ALECR1, ALGFPO, BOTTOM, CZET11,
CZET12, CZET13, EIZETA, HALFPI, SZET10,
XAPYLO, TGUSTW, ZAPYLO, ZFLWG1, ZFRWG1
* TZMS, TIMS, T2MS, TZTS, T1TS, T2TS.
C CLOCK, FLOCK, XLCK, TCLOCK
22, VXS(2), VYS(2), VZS(2), BETA(12,2),
T, PCC(12), CDSE(7,7,2), BETAN(2), BETAX(2), BETAZ(2).
* * * * *
1 AIB(2), APDO, AROD, AYD0, AIR(2),
DPSI(12,2), OTRR, NPSI(2), ZZTR.
2 BETA0(12,2), BNPSI(2),
COND2, GMAXV, RATE1, RATE2, STOP2,
THROT(2), TRINO, XGUST, BETAZ0(2), GMAXV1,
GMAXV2, GMAXV3, GUSTYP, MNPSIR(2),
HUBKPS, HUBKRS, HUBTPS, HUBTRS,
KONFIG, LNGTH1, PILGH1, PSIREF(2),
START2, XMOPH1(112,2),
9 RM, RTR, ORTR, ORTR, TINT, TITT,
T2MT, T2TT, TZMT, TZTT, XMAIL, XMAILT,
XMB1, XMBIT, AIBPT, AIBRM, AIBRT,
APTO, APTO, ARTO, ARTO, PSO, PSDT,
XSTAHM, XSTAHM, YSTAHM, YSTAHM,
HUBKP, HUBKTP, HUBKR, HUBKTR
F AZETA, AZETAT, VZETA, VZETAT
I, V, INO, NMAG, APBNT, ARBNT, AYBNT, BETAO(2), TDEL T.
BETA(2), MGUSTF, MGUSTW, VGUSTE,
VGUSTW, VGUSTF, GFWD, GLAT, GVERT,
VXB, VZB, APO, VYB, ARD, AYD,
COLSTK, CYSTK1, CYSTK2, PEDAL, AYE,
APE, ARE, AIM, RIM, AITP, B1TR,
XAR(2), YAR(2), ZAP(2),
VIMR, VTR, ZETA, ZETATR, HMR, HTR,
TMR, TTR, QMX, QTR, YMRF, YTRF
A AH(3), AL(3), EXIT, ICOM(49), IPSN,
NPART, NVARA, NVARR, NVARC, NSCALE
1 * NVARS, NPRINT, NTIMF
COMMON /FORY/
Y(4,150)
REAL LGUN, MGUN, NGUN
DIMENSION TAX(2), PSID(2), HUBK(2,2)
DIMENSION CONLOK(4), THETS(6), THET(6), XMOM(3), PDM(3,4), DTMETO(3)
EQUIVALENCE (TAX(1), TAXU), (PSID(1), PSO), (HUBK(1,1), HUBKP)
XDELIM(X1,X2,X3)=AMAX1(X1,AMIN1(X2,X3))
*NEGMOD=0,
IF(I=GT,2) GO TO 221
OPC=0,
GOV=0,
QOC=1,
*1435(V1,9)-0ME(GM).LT..311 000:=>

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221 DO 220 L=1,KREAD
J=KCIT(L)
IF(J.EQ.28) GO TO 282
IF(J.EQ.31) GO TO 295
IF(J.EQ.6,OR.J.GT.26) GO TO 273
IF(J.GT.23) GO TO 220
IF(J.EQ.23) GO TO 219
IF(J.EQ.13) GOV=-1.
IF(J.LT.9,OR.J.GT.12) GO TO 223
CALL GUST (J)
GO TO 220
223 CONTINUE
IF(J.EQ.18) GO TO 214
IF(ITIME.LT.XCIT(L,1)) GO TO 220
IF(J.GT.12) GO TO 413
RATE=XCIT(L,2)

C J.EQ.1 IS FOR MR. COLLECTIVE INPUT
C J.EQ.2 IS FOR MR. FA CYCLIC INPUT
C J.EQ.3 IS FOR MR. LATERAL CYCLIC INPUT
IF(ITIME.GT.XCIT(L,3)) RATE=0.
IF(ITIME.GE.XCIT(L,4)) RATE =+XCIT(L,5)
IF(ITIME.GT.XCIT(L,6)) RATE=0.
DA=RATE*HDELT
IF(J.EQ.5) GO TO 264
IF(RATE.EQ.0.) GO TO 220
30 TO (260,261,262,263,264,265,266,267).J
260 CONTINUE
COLSTK=XDELIM(0.,100.,COLSTK+DA)
WGCOL =CPMIC*COLSTK+AGM
GO TO 220
261 CONTINUE
CYSTK1=XDELIM(0.,100.,CYSTK1+DA)
CYCR1=CYSTK1*CYCF(3)+CYCF(2)
ALECR1=ALGEZ+CYCR1*(ALGE1+ALGE2*CYCR1)
GO TO 220
262 CONTINUE
CYSTK2=XDELIM(0.,100.,CYSTK2+DA)
CYCR2=CYSTK2*CYCL(3)+CYCL(2)
ALCYP=CYPMIC*CYCR2
GO TO 220
263 CONTINUE
PEDAL=XDELIM(0.,100.,PEDAL+DA)
PED=PEDAL*PEDA(3)+PEDA(2)
ALGFPD=ALGF+RUDIND*PED
GO TO 220
264 PRATE=PCGMAX *HDELT**2
IF(XCIT(L,3).LT.TIME.AND.ITIME.LT.XCIT(L,4)) GO TO 220
IF(XCIT(L,6).LT.TIME) GO TO 220
OPC=10.
IF((DA*PSD550).EQ.0.) GO TO 220
QMR5=XDELIM(0.,QMRSA,QMRS+DA/PSD550)
GO TO 220
273 CONTINUE
IF(LSTOP.NE.0.AND.I.EQ.4) GO TO 274

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IF(PSD.EQ.0.) GO TO 223
IF(J.EQ.29) GO TO 276
GO TO 220
274 CONTINUE
1STOP=2
IF(J.EQ.29) GO TO 275
XCIT(L,1)=XCIT(L,1)+T
IF(J.EQ.30) GO TO 279
XCIT(L,3)=XCIT(L,3)+T
IF(J.EQ.27) GO TO 220
XCIT(L,4)=XCIT(L,4)+T
XCIT(L,6)=XCIT(L,6)+T
GO TO 220
275 CONTINUE
IF(XCIT(L,3).NE.0.) XCIT(L,1)=XCIT(L,1)+T
IF(XCIT(L,4).NE.0.) XCIT(L,2)=XCIT(L,2)+T
276 CONTINUE
IF(XCIT(L,3).EQ.0.) GO TO 223
GO TO 220
277 CONTINUE
XCIT(L,2)=XCIT(L,2)+T
GO TO 220
278 CONTINUE
XCIT(L,2)=XCIT(L,2)+T
GO TO 220
279 CONTINUE
CALL TFFA (XAR,BETAZ,CGSTA)
GO TO 220
280 OMEGM=OMEGM+DA
    OMEGM=RATE+OMEGM
    200=1.
GO TO 220
281 ZFTATR=ZETATR+CA
282 XAR(2)=XARSP(2)+ML(2)*SIN(ZETATR)
    C2TR=COS(ZETATR)
    YAR(2)=YARSP(2)-HLTR2*C2TR
    ZAR(2)=ZARSP(2)-MLTR1*C2TR
    AYBMT=ZETATR*TRIND2
    APBMT=-ZETATR*TRIND1
    VZETAT=RATEF
    IF(J.EQ.20) AZETAT=AZ
    GO TO 220
283 CONTINUE
    IF(J.EQ.27) GO TO 226
    IF(J.EQ.29) GO TO 283
    IF(J.EQ.30) GO TO 284
    K=J-12
    GO TO 220
285 GO TO (209,210,211,212,213,214,215,216,217,218,219).K
    279 IF(TIME.GE.XCIT(L,3)) GO TO 270
    200=XCIT(L,2)

```

```

OMRSA=XOELIM(0..QMAX,XCIT(L,6))
QMRSA=QMRSA
GO TO 220
270 GO=XCIT(L,5)
GO TO 220
212 IF( TIME.LT.XCIT(L,1)) GO TO 220
DA=XCIT(L,3)*HOELT
N=XCIT(L,6)*.01
IF(XCIT(L,2)=.0) GO TO 225
TAX(N)=TAX(N)+DA
IF(SIGN(L,DA)=EQ.SIGN(L,(XCIT(L,5)-TAX(N)))) GO TO 220
TAX(N)=XCIT(L,5)
222 XCIT(L,1)=9999.
GO TO 220
275 IF( TIME.GE.XCIT(L,4)) GO TO 222
TAX(N)=TAX(N)+DA
GO TO 220
211 IF(ALERT.EQ.0.AND.ABS(AY).LT.XCIT(L,2)) GO TO 220
IF(TIME.GE.XCIT(L,6)) GO TO 220
ALERT=1.
AYID=(AY-AY1)*DELT2R
AYDAB5=ABSIAY1D1
AYDMX=AMAXI(AYDMX,AYOABS1)
..... SAVES LARGEST YAW RATE (ABS.).
..... UNTIL PILOT GOES OFF ALERT.
C IF(ABS(AY).GE.XCIT(L,2)) GO TO 710
IF(AYDAB5 .GE.(XCIT(L,5)*AYDMX))GO TO 710
ALERT=0.
AYOAKX=0.
GO TO 220
710 DA=(AY+XCIT(L,3)*AY10*XCIT(L,4))*HOELT
GO TO 263
C WEAPONS GROUP
212 FGUN=0.
IF(XCIT(L,2).LT.TIME) GO TO 250
RMLTH=XCIT(L,4)
TIMEIN=T-XCIT(L,1)
IF(TIMEIN.LT.RMLTH) FGUN=TIMEIN*XCIT(L,5)
IF(TIMEIN.GE.RMLTH) FGUN=XCIT(L,3)
250 CALL RATS (FGUN,.0..AYBG.APBG.AR8G.XFGUN.YFGUN.ZFGUN,NGUN)
CALL DOGS (XAGUN,YAGUN,ZAGUN,XFGUN,YFGUN,ZFGUN,LGUN,NGUN)
GO TO 220
213 IF(XCIT(L,3).LT.TIME) GO TO 220
RATE=XCIT(L,2)
DA=RATE*HRELT
'71 ZETA=ZETA+DA
VZETA=RATE
IF(J.EQ.201 AZETA=AZ
ZETATR=ZETA
CALL TILT (XAR,ZAR,CGWL,COLL,ZETA,CGSTA)
ALF=XCIT(L,5)
IF(ZETA.LE.ALF) GO TO 205
BET=XCIT(L,4)
DOMEQ=XCIT(L,6)*SIN((ZETA-ALF)*BET)*DA

```

```

    OMEGA=OMECH+0OMECH
    OMEGAD=0OMECH+PROELT2+0OMEGM0
    QQQ=1.
    GO TO 205
214 CONTINUE
    IBRAKE=0
    IF ITIME.GT.XCIT(L,4).DR.PS10(1).GT.XCIT(L,2) IBRAKE=1
    GO TO 220
215 OLOASE=ASEP
    TLAG=XCIT(L,6)+PROELT2
    ASEP=(XCIT(L,2)+(XCIT(L,5)-APE)*XCIT(L,3)*APD+XCIT(L,4)*VIT(L-1,80)
    +OLOSE*TLAG)/(L.+TLAG)
    DA=ASEP
    GO TO 261
216 IF ITIME.GT.XCIT(L,4) GO TO 220
    OT=XCIT(L,2)*(IT-XCIT(L,1))
    RATE=XCIT(L,3)*COS(OT)
    DA=RATE+DELT
    K=XCIT(L,5)+.1
    IPIK.EQ.51 AL=.XCIT(L,2)*XCIT(L,3)*SIN(OT)
    GO TO (260,261,262,263,271),K
217 IF (ABS(HALFPI - ZETA)).GT.0.001) GO TO 220
    OAI=XCIT(L,3)*PROELT
    OI=AIM-XCIT(L,4)
    IF (ABS(Q1).GT.XCIT(L,2)) DT1(1)=DT1(1)+OAI*Q1
    Q1=B1M-XCIT(L,5)
    IF (ABS(Q1).GT.XCIT(L,2)) DT2(1)=DT2(1)-OAI*Q1
    GO TO 220
218 IF (ABS(HALFPI - ZETATR)).GT.0.001) GO TO 220
    OAI=XCIT(L,3)*PROELT
    Q1=ALTR-XCIT(L,4)
    IF (ABS(Q1).GT.XCIT(L,2)) DT1(2)=DT1(2)+OAI*Q1
    Q1=BLTR-XCIT(L,5)
    IF (ABS(Q1).GT.XCIT(L,2)) DT2(2)=DT2(2)-OAI*Q1
    GO TO 220
219 CONTINUE
    N=XCIT(L,1)+.1
    HUBK(N,1)=XOELIM(XCIT(L,3)*XCIT(L,2),
    HUBK(N,1,N)*PS10(N)+HUBK(L,1,N))
    1-HUBK(N,2)=XDELIM(XCIT(L,3)*XCIT(L,2),
    HUBK(N,2,N)*PS10(N)+HUBK(L,2,N))
    1
    GO TO 220
220 CONTINUE
    N=XCIT(L,1)+.1
    BETANN=XOELIM(XCIT(L,3)*XCIT(L,2)*XCIT(L,4)*XCIT(L,5)*PS10(N))
    IF (BETANN.EQ.XCIT(L,2).AND.XCIT(L,6).GT.-.5) GO TO 220
    IF (BETANN.EQ.XCIT(L,3).AND.XCIT(L,6).LT.-.5) GO TO 220
    BETANN(N)=BETANN
    YPSIN=NPSIN(N)
    IF (BETANN.EQ.XCIT(L,2)) XCIT(L,6)=1.
    IF (BETANN.EQ.XCIT(L,3)) XCIT(L,6)=-1.
    DA=?
    IF (BETAZ(N).GT.(-BETANN).LT.(-BETANN).AND.BETAZ(N).LT.BETAZ(N))
    DA=BETAZ(N)+BETANN
    VARI2710
    VARI2720
    VARI2730
    VARI2740
    VARI2750
    VARI2760
    VARI2770
    VARI2780
    VARI2790
    VARI2800
    VARI2810
    VARI2820
    VARI2830
    VARI2840
    VARI2850
    VARI2860
    VARI2870
    VARI2880
    VARI2890
    VARI2900
    VARI2910
    VARI2920
    VARI2930
    VARI2940
    VARI2950
    VARI2960
    VARI2970
    VARI2980
    VARI2990
    VARI3000
    VARI3010
    VARI3020
    VARI3030
    VARI3040
    VARI3050
    VARI3060
    VARI3070
    VARI3080
    VARI3090
    VARI3100
    VARI3110
    VARI3120
    VARI3130
    VARI3140
    VARI3150
    VARI3160
    VARI3170
    VARI3180
    VARI3190
    VARI3200
    VARI3210
    VARI3220
    VARI3230
    VARI3240

```

```

1DA=BETAZ(N)-AMIN1(BETAZS(N)),-(BETANM))
BETAZ(N)=BETAZ(N)-DA
BETAX(N)=BETAZ(N)*2.-BETANM
00 301 K=1,NPSIN
BETAK,N)=BETAK(K,M)=0A
Y(1,7*N+K+10)=Y(1,7*N+K+10)=0A
301 CONTINUE
IF(KONFIG.EQ.3) CALL TFFA (XAR,BETAZ,CGSTA)
GO TO 220
283 CONTINUE
XLOK=1.
IF(XCIT(L,6).EQ.0.) GO TO 277
XLOK=0.
XCIT(L,2)=9999.
277 CONTINUE
N=XCIT(L,5)
00 278 M=1,4
N1=5-N
N2=2** (N1-1)
IF(N.LT.N2) GO TO 278
COMLOK(N1)=XLOK
THETS(N1)=THET(N1)
IF(N1.GT.2) THETS(N1+2)=THET(N1+2)
N=N-N2
278 CONTINUE
XCIT(L,1)=XCIT(L,2)
XCIT(L,3)=XCIT(L,4)
XCIT(L,6)=1.
GO TO 220
284 CONTINUE
IF(TIME.LE.XCIT(L,2)) GO TO 285
KPD=0
XCIT(L,1)=9999.
GO TO 220
285 :CONTINUE
IF(L.NE.2) GO TO 292
XMOM(1)=ZF
XMOM(2)=XMB1
XMOM(3)=XMA1
IF(KPO.NE.0) GO TO 286
00 287 K=1,3
00 286 M=1,3
POM(K,M)=0.
286 CONTINUE
POM(K,K)=XCIT(L,K+2)
POM(K,4)=XMOM(K)
287 CONTINUE
GO TO 290
288 CONTINUE
00 289 K=1,3
POM(K,KPO)=(XMOM(K)+POM(K,4))/OTHET
'OM(K,4)=XMOM(K)
289 CONTINUE
OTHETO(KPO)=OTHET

```

```

290 CONTINUE
  KPD=KPD+1
  IF(KPD.EQ.4) KPD=1
  DO 291 K=1,4
    DO 291 M=1,3
      PDPHIM(K)=PDM(M,K)
  291 CONTINUE
  KM1=3
  CALL SOLVE
  IF(EXIT.EQ.0) GO TO 293
  DTNET=0.
  EXIT=0.
  GO TO 294
293 CONTINUE
  DTNET=XI(KPD)
  XLI(MD-XCITIL,6)*TDELT
  DTNET=XDELIM(-XLI(MD,XLI(MD,DTNET))
294 CONTINUE
  DXMIN=.8726646E-02*TDELT
  IFIAS(DTNET).LT.DXMIN) DTNET=SIGN(DXMIN,DTNET0(KPD))
292 CONTINUE
  THETSI(KPD)=THETSI(KPD)+.5*DTNET
  GO TO 220
295 CONTINUE
  DO 296 K=1,5*2
    IF(TIME.GF.XCITIL(K)) NPRINT=XCITIL(K+1)
296 CONTINUE
  IF(NPRINT.LE.0) NPRINT=-1
  GO TO 220
226 CONTINUE
  IF(XCITIL(3).LT.TIME) GO TO 220
  DA=XCITIL(2)*HDELT
  K=XCITIL(4)+1
  K1=K
  NPSI1=NPSI1(1)
  IFIG,NE,1) GO TO 228
  PSIREF11=PSIREF11+DA
  Y11,7)=Y11,7)+DA
  DO 227 M=2,NPSI1
    DPSI1(M,1)=DPSI1(M,1)-DA
  227 CONTINUE
  K1=NPSI1
  GO TO 231
228 CONTINUE
  DPSI1(K,1)=DPSI1(K,1)+DA
231 IF(HUBKPS.NE.0.) GO TO 220
  DO 230 N=K,K1
    DO 229 M=1,NPSI1
      COSEIM(N,1)=COS(DPSI1(M,1)-DPSI1(N,1))
  229 CONTINUE
  COSF(N,M,1)=1.
230 CONTINUE
  CALL HSAF (XAR,YAR,DPSI,NPSI,CGSTA,PSIREF)

```

220 CONTINUE
QFTURN
FND

VARI4330
VARI4340
VARI4350

```

SUBROUTINE VIND (N,EXIT)
COMMON /ROMAN/
22,VXS(2),VYS(2),VZS(2),BETA(12,2),
T,PCC(2),COSE(7,7,2),BETAN(2),BETAX(2),BETAZ(2),
AIB(2),APDD,APDD,AYD(2),
DPSI(12,2),DTR,NPSI(2),ZZTR,
BETA(12,2)*BNPSI(2),
1
COMD2,GMAXV,RATE1,RATE2,STOP2,
THROT(2),TRIND,XGUST,BETAZ(2),GMAXV,
2
GMAXV2,GMAXV3,GUSTYP,MPSIR(2),
HUBKPS,HUBKRS,HUBTPS,HUBTRS,
3
KONFIG,LNGTH1,PILGH1,PSIREF(2),
START2,XMOMLI(12,2),
4
R(2),OR(2),T1(2),
5
T2(2),TZ(2),XMA(2),
6
XMB(2),AIBP(2),AIBR(2),
APDR(2),ADR(2),PS10(2),
7
XSTAH(2),YSTAH(2),
8
HUBKPR(2),HUBKRR(2),
9
*AZETAR(2),VZETAR(2),
10
*V,IND,MMAG,APBMT,ABMT,AYBMT,BETAD(2),TDELT,
11
BETA(2),HGUSTE,MGUSTE,MGUSTW,VGUSTE,
12
VGUSTW,YGUSTF,GFWD,GLAT,GVERT,
13
VXB,V2D,APD,V2B,ARD,AYD,
14
COLSTK,CYSTKL,CYSTK2,PEDAL,AYE,
15
APE,ARE,A1H,B1H,ALTR,BITR,
16
XAR(2),YAR(2),ZAR(2),
17
VIR(2),ZETAR(2),MFFORCE(2),
18
THRUST(2),TORQUE(2),MFFORCE(2),
19
J,W,ITH,VHS(2),LINK,QUEL,VROT(2),
20
VSND,YFIN(2),ZFEL(2),AIBALL(2),
21
BIBALL(2),COND1,SWING,PILGH2,PWGCEL1,
22
A(2),PMOM(2),RMOM(2),
23
COMMON /ROSTAR/
AM(2),OCT,P1,XR(2),ALT,ADR(2),EXH(2),
24
NR(2),RBH(2),SWC(2),UHS,CDHB(2),LROT(2),
25
2AIB(2),RTRP(2),TAIRI14),CONEK(2),DCAFR(2),FVINO,
26
NWARD,
27
SWKR(2),SMKR2(2),TIP1B(2),TIP3B(2),
28
TWIST(20,2),CLRADM(2),OELTA3(2),
29
LAMBDA(2),UPGUST,URGUST,UTGUST,WROTOR,
30
FR(2),FRX(2),
31
XLIMIN(2),XLIMAX(2),
32
PEAL,LAMBOA,LAM2
33
BB=1,-2,*SORT(IABS(CT)) / (IABS(OR(N))*B(N))
34
CB=CT/(BB*BB-ADR(N))
35
Q1=ABS(CB)
36
Q2=-6*01*SORT(01)
37
Q3=01+A.*UHS
38
Q4=02/03
39
Q5=01*04
40
Q6=2.666667*04
41
LAMBDA(N)=VZS(N)
42
L=100
43
L=L-1
44
11 CONTINUE
45

```

```

IF(L.LE.0) GO TO 30
VIRS=VIR(N)
LAM2=LAMBDA(N)**2
VIR(N)=CB/(SQRT(.866*LAM2+UHS)+(QS-.05*LAMBDA(N))*ABS(LAMBDA(N)))/
1 (Q1+.A.*LAM2)
LAMBDA(N)=VZS(N)-VIR(N)
IF(ABS(VIR(N))-VIRS).GT..0001) GO TO 10
VIND0550
VIND0560
VIND0570
VIND0580
VIND0590
VIND0600
VIND0610
VIND0620
VIND0630
VIND0640
VIND0650
VIND0660
VIND0670
VIND0680
VIND0690
VIND0700
VIND0710
VIND0720
VIND0730
VIND0740
VIND0750
VIND0760
VIND0770
VIND0780
VIND0790
VIND0800

GROUND EFFECT - FOR V.LT.30 AND IF H IS FROM .25 TO 1. ROTOR DIAME
VIND0530

GRE=.25+.5*ALT/R(N)
IF(GRE.GT.1.) RETURN
IF(VROT(N).LE.30.) VIR(N)=VIR(N)*(1.+(GRE-1.)*((VROT(N)-30.))
1 /30.)**2
1 IF(GRE.GE..25) RETURN
EXIT=1.
WRITE(6,9000)
RETURN
30 WRITE(6,9001)
VIR(N)=0.
LAMBDA(N)=VZS(N)
RETURN
9000 FORMAT(128HO,.....SHIP CONTACTS GROUND)
901 FORMAT(127HO,INDUCEO VELOCITY SET TO 0./28H CALCULATIONS NON-CONVERG
1 ENT)
EN0

```

```

SUBROUTINE MAG1
DIMENSION HEAD(12),FX(61,4),XD(4),DETH(31,4),KFLAG(4)
DATA HEAD /'MAINTAIL'/
DO 100 L=1,4
KFLAG(L)=0
100 CONTINUE
RETURN
      FNTRY MAG (CHR,K,I,V,TDELT,RED,DLIFT)
      RED=0.
      IF(KFLAG(I).EQ.1) GO TO 140,30,30,I
      1 K2=(K-1)/2+1
      K4=(K-1)/4+1
      DETH(K4,I)=DLIFT
      IF(I.GT.2) GO TO 8
      DD=TDELT*.5*V/(2.*CHR)
      IF(K2.GT.2) GO TO 2
      IF(DO.GT..5) GO TO 41
      GO TO 9
      8 DD=TDELT*V/CHR
      IF(K2.GT.2) GO TO 2
      IF(DO.GT.7.5) GO TO 31
      9 IF(K2.NE.1) GO TO 2
      XD(I)=DD
      GO TO 3
      2 IF(MOD(K,2).EQ.1) XD(I)=DD+XD(1)
      3 A=XD(I)
      IF(I.GT.2) GO TO 4
      IF(A.GT.1.) GO TO 5
      FX(K2,I)=1.-(.5+A*(6.011997+A*(-28.92326+A*(72.13591
      1+A*(-97.5837+A*(67.39273+A*(-18.53368))))))
      IF(K.LE.10) GN TN 10
      GO TO 5
      4 IF(A.GT.15.) GO TO 5
      FX(K2,I)=.288*EXP(-.49*A)
      IF(K.LE.120) GN TN 10
      5 DO 6 J=2,K4
      6 DETH(J-1,I)=DETH(J,I)
      K=K-1
      K2=K2-1
      K4=K4-1
      10 DO 20 J=1,K4
      M=K2-2*(J-1)
      20 RED=RED+DETH(J,I)*FX(M,I)
      25 RETURN
      30 KFLAG(I)=1
      30 WRITE (6,60)
      60 FORMAT (1H0,13X,'ALLEVATION DEVICE FOR WINGS BYPASSED BECAUSE WINNAG00470
      1G CHORD IS TOO SMALL FOR THIS TIME INCREMENT AND VELOCITY.')
      70 FORMAT (1H0,
      1   'ALLEVATION DEVICE FOR ROTORS BYPASSED FOR ',A4.
      1   'ROTOR DIAMETER IS TOO SMALL FOR THIS TIME INCRWAG00530
      1   'ZEMENT AND VELOCITY.')
      40 KFLAG(I)=1
      40 WRITE (6,70) HEAD(I)
      70 FORMAT (1H0,

```

DOFTURN
END

WAG00550
WAG00560

```

SUBROUTINE WRFM
COMMON /FORCE/ A(171)
COMMON /ROMAN/ 22*VXS(2)*VYS(2)*VTS(2)*VTS(2)*BETA(12*2)*
                T*PCC(2)*CSE(7*2)*BETAN(2)*BETAX(2)*BETAZ(2)*
                * A16(2)*APDD*ARDO*AYDD*AIR(2)*
                1   DPSI(12*2)*DTRR*NPSI(2)*22TR*.
                2   BETAD(12*2)*BNPSI(2)*.
                3   COND2*GMAXV*RATE1*RATE2*STOP2*.
                4   THROT(2)*TRIND*XGUST*BETAZD(2)*GMAXV1*.
                5   GMAXV2*GMAXV3*GUSTYP*HNP$IR(2)*.
                6   HURKPS*HURKRS*HUBTPS*HUBTRS*.
                7   KONFIG*LNGETH1*PILGH1*PSIREF(2)*.
                8   START2*XMONLI(12*2)*.
                9   RM,RTR,ORM,DRTR,TIMT,TITI*.
                A   T2MT,T2TT,T2MT,T2TT,XMA1,XMA1T*.
                B   XMB1,XMB1T,AIBPM,AIBPT,AIBRM,AIBRT*.
                C   APTD,APTD,ARTD,ARTO,PSO,PSOT*.
                D   XSTAHH,XSTAHT,YSTAHH,YSTAHT*.
                E   HURKP,HURKTP,HURKR,HURBKTR
                F   *AZETA*AZETAT*VZETA*VZETAT
                WRITE (6,10) A,XMB1,XMA1,XMB1T,XMA1T
                RETURN
10 FORMAT (1H0,54X,*FORCE AND MOMENT SUMMARY //*
                1   1H *15X,*TOTAL R.WING L.WING
                2   4X,*R-JET L.JET M.R. T.R. ELE GUN FUS*,FIN*.
                3   4X,*W/QMR QTR //*
                4   1H * X-FORCE *12F9.1/
                5   1H * Y-FORCE *F9.1*27X,8F9.1/
                6   1H * Z-FORCE *10F9.1*9X,F9.1/
                7   1H * ROLL *13F9.1/
                8   1H * PITCH *13F9.1/
                9   1H * YAW *13F9.1/
                A   1H * MR F/A MOM*F9.1/
                B   1H * MR LAT MOM*F9.1/
                C   1H * TR F/A MOM*F9.1/
                D   1H * TR LAT MOM*F9.1///1
                FEND

```

```

SUBROUTINE WROT1
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1          NPART,NVARA,NVARB,NVARC,NSCALE
1          *NVARS,NPRINT,NTIME
DIMENSION NDATE(2)
CALL DATE (NDATE)
RETURN
ENTRY WROT
WRITE (6,1000) NDATE,NPART,IPSN,ICOM
RETURN
1000 FORMAT (1H1,46X,'BELL HELICOPTER 18M 360/ PROGRAM ASAJO!'/,
1           1H ,46X,'HELICOPTER RIGID BODY DYNAMICS ANALYSIS!'/,
2           1H ,57X,'COMPILED 10/30/69!'/,
3           1H ,57X,'COMPUTED ',2A4//,
4           1H0,18X,I4,4X,19,5X,15A4/IH ,32X,17A4,/1H ,32X,17A4)
END

```

THE ACTION TAKEN IN THIS SUBROUTINE DEPENDS ENTIRELY UPON N:

IF N=1 - WRITE VARIABLES INDICATED IN TRIM AND STAB AND ROTOR DATA ONLY

MRVP0010
 MRVP0020
 MRVP0030
 MRVP0040
 MRVP0050
 MRVP0060
 MRVP0070
 MRVP0080
 MRVP0090
 MRVP0100
 MRVP0110
 MRVP0120
 MRVP0130
 MRVP0140
 MRVP0150
 MRVP0160
 MRVP0170
 MRVP0180
 MRVP0190
 MRVP0200
 MRVP0210
 MRVP0220
 MRVP0230
 MRVP0240
 MRVP0250
 MRVP0260
 MRVP0270
 MRVP0280
 MRVP0290
 PITMRVP0290
 1CH MOM ROLL MOM MR F/A MOM MR LAT MOM TR F/A MOM TR LAT MOM
 2 COLLECTIVE F/A CYCLIC LAT CYCLIC PEDAL PITCH YAW
 3 MR F/A FLAP MR LAT FLAP TR F/A FLAP TR LAT FLAP -ERROR

C
 COMMON /MANARD/ I,V,IND,NWAG,APBMT,AYBMT,BETA0(1),TDELT,
 BETA0(2),HGUSTF,HGUSTW,VGUSTF,
 VGUSTW,YGUSTF,GFWD,GLAT,GVERT,
 VXB,VZB,APD,VYB,ARD,AVD,
 COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
 APE,ARE,AIM,BIM,ATR,BITR,
 XAR(2),YAR(2),ZAR(2),
 VIMR,VITR,ZETA,ZETAR,HMR,HTR,
 TMR,TTR,QMX,QTR,YMRF,YTRF

A
 COMMON /KVARTR/ KVARI(10)

N DETERMINES WHICH TYPE OF OUTPUT
 KM1 = PANK OF PARTIAL DERIVATIVE MATRIX

DIMENSION VAR(11),PD(10,11),HEAD(3,21)
 DIMENSION HEAD(2,2),VARD(11)
 DATA DTRR/ 57.2957795/
 DATA HEAD/ 0 X-FORCE Y-FORCE Z-FORCE YAW MOM PITMRVP0290
 1CH MOM ROLL MOM MR F/A MOM MR LAT MOM TR F/A MOM TR LAT MOM
 2 COLLECTIVE F/A CYCLIC LAT CYCLIC PEDAL PITCH YAW
 3 MR F/A FLAP MR LAT FLAP TR F/A FLAP TR LAT FLAP -ERROR

41/
 DD 4A I=1,2
 HEAD(1,16)=HEAD(1,1)
 4B CONTINUE
 RETURN
 ENTRY MRVP (N,VAR,KM1,PD,TAXL,TAXR)
 IF(N.EQ.2) GO TO 40
 DD 39 L=1,11
 DA=1.
 IF(L.GT.4) DA=DTRR
 VARD(L)=VAR(L)*DA
 39 CONTINUE
 BETADM=BETA0(1)*DTRR
 BETADT=BETA0(2)*DTRR
 WRITE (6,20) (VARD(KVAR(L)),L=1,KM1)
 WRITE (6,10) TMR,MMR,YMRF,QMX,VIMR,BETADM,TAXR,TTR,HTR,
 1 YTRF,QTR,VITR,BETA0,TAXL
 IF(N.EQ.1) RETURN
 40 WRITE (6,30) ((HEAD(I,J),I=1,3),J=1,KM1)
 DO 50 J=1,KM1
 401 WRITE (6,60) (HEAD(I,J+10),I=1,3),(PD(I,J),I=1,KM1)
 50 CONTINUE

```

      WRITE (6,60)  (HEAD(I,21),I=1,3),(PD(I,KM1+1),I=1,KM1)
      RETURN
    20 FORMAT (1HO,11X,'VAR(I)',10F10.5)
    10 FORMAT (//1H   'THRUST'     'Y-FORCE'   'TORQUE'   '.
    1       'IND. V. CONING'   'JET THRUST' /16X,
    2       'MAIN ROTOR',4F10.0,2F10.3,5X,'RIGHT/CENTER',F10.0/16X,
    3       'TAIL ROTOR',4F10.0,2F10.3,5X,'LEFT'     'F10.0/
  30 FORMAT (1HO,53X,'PARTIAL DERIVATIVE MATRIX',/1HO,11X,30A4/)
  60 FORMAT (1H   '3A4,10F12.0)
      END

```

MRVPO550
:MRVPO560
MRVPO570
MRVPO580
MRVPO590
MRVPO600
MRVPO610
MRVPO620
MRVPO630
MRVPC640

```

SUBROUTINE YFIX (YIN,YAERO)
DIMENSION HEAD(9),YIN(21,5),YAERO(31,5)
DATA HEAD / 'M.R.T.R.WING ELE FINNORMAL REVERSED'
DATA DTRR,P123,DTRRSQ / 57.29578,2.0943951,3282.806 /
DO 15 I=1,16
DO 15 J=1,5
IF(I.EQ.13.DR.I.EQ.17) DO=DTRR
IF(I.EQ.14) DO=DTRRSQ
DO 18 J=1,2
YAERO(I,J)=YIN(I,J)*DD
18 CONTINUE
15 CONTINUE
DO 20 J=1,5
IF(YAERO(17,J).EQ.0.) GO TO 20
YAERO(18,J) = YAERO(18,J)*P123
ALB1MR=YAERO(17,J)*YIN(18,J)/(2.+YIN(18,J))
IN1=-1
IN2=2
DO 25 IN=22,23
IN1=IN1+4
IN2=IN2+2
YAERO(IN,J)=YAERO(IN,J)/ALB1MR+.008727
IF(YAERO(IN,J).LE..69813) GO TO 25
YAERO(IN,J)=-.61087*ALB1MR
YAERO(IN,J) = -.69813
WRITE (6,26) HEAD(J),(HEAD(IN2+K),K=2,3),YAERO(IN1,J)
25 CONTINUE
27 CONTINUE
YAERO(20,J)=SIN(YAERO(22,J))
YAERO(24,J)=SIN(2.*YAERO(22,J))
YAERO(26,J)=COS(YAERO(22,J))
YAERO(21,J)=SIN(YAERO(23,J))
YAERO(25,J)=SIN(2.*YAERO(23,J))
YAERO(27,J)=COS(YAERO(23,J))
IF(YAERO(1,J).LT.1.) GO TO 12
YAERO(1,J)='99
WRITE(6,101) HEAD(J),YAERO(1,J)
12 SM = SQRT(1.+(1.-YAERO(1,J)**2)*16./YAERO(17,J)**2)
IF(YAERO(2,J).GT.SM) GO TO 29
YAERO(2,J)=SM
WRITE (6,102) HEAD(J),YAERO(2,J)
29 YY1 = YAERO(17,J)/SQRT(1.-YAERO(1,J)**2)
YY2 = 4./SQRT(YAERO(2,J)**2-1.)
YY3 = -YY2*YAERO(2,J)/(YAERO(2,J)**2-1.)
DEN = 1./(YAERO(12,J)-YAERO(1,J))**2
YAERO(31,J) = (YY1-YY2-YY3*(YAERO(1,J)-YAERO(2,J)))*DEN
YAERO(30,J) = YY3 - 2.*YAERO(31,J)*YAERO(2,J)
YAERO(29,J) = YY1-YAERO(30,J)*YAERO(1,J)-YAERO(31,J)**2*YFIX0480
20 CONTINUE
RETURN
26 FORMAT (1HO,10X,A4,' CLZ FOR '2A4,' FLOW HAS BEEN RESET TO
1          F6.3,' ALB = 40 DEGREES.')
101 FORMAT (1HO,10X,A4,' DRAG DIVERGENCE MACH NUMBER HAS BEEN RESET TO
1          F6.3)

```

172 FORMAT (1HO,10X,A4,1 MACH NUMBER FOR LOWER BOUND OF SUPERSONIC REGYFIX0550
ITION HAS BEEN RESET TO ' ,F6.3)
END
YFIX0560
YFIX0570

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Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Bell Helicopter Company Fort Worth, Texas 76101		2a. REPORT SECURITY CLASSIFICATION Unclassified
		2b. GROUP
3. REPORT TITLE A STABILITY AND CONTROL PREDICTION METHOD FOR HELICOPTERS AND STOPPABLE ROTOR AIRCRAFT -- VOLUME IV		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Final Report		
5. AUTHOR(S) (First name, middle initial, last name) Billy J. Bird		
6. REPORT DATE February 1970	7a. TOTAL NO. OF PAGES 304	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO. F33615-69-C-1121	8b. ORIGINATOR'S REPORT NUMBER(S)	
9. PROJECT NO. 8219		
c. Task No. 821907 d.	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) AFFDL-TR-69-123, Volume IV	
10. DISTRIBUTION STATEMENT This document has been approved for public release and sale; its distribution is unlimited.		
11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Air Force Flight Dynamics Laboratory Wright-Patterson AFB, Ohio 45433	
13. ABSTRACT This report describes a mathematical model of rotorcraft that may be used to determine characteristics of performance, stability, response, and rotor blade loads. The complexity of the equations used requires the use of a digital computer for efficient solution. This four volume report describes the computer program in detail and illustrates the method of computing rotorcraft characteristics by specific example. This volume contains the Appendices. Volume III describes the contents and use of these appendices in detail. The first and second volumes contain a discussion of the mathematical model and detailed instructions for the users of the program. These appendices, which originate from card images for easy updating, are necessary tools for any programmer working on this program.		

DD FORM 1 NOV 66 1473

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Helicopter Stability and Control Stopable Rotor Aircraft Stability and Control V/STOL Aircraft Rotorcraft Simulation						

~~UNCLASSIFIED~~

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